THE ROYAL SOCIETY OF TASMANIA
THE ADVANCEMENT OF KNOWLEDGE

Papers and Proceedings of The Royal Society of Tasmania

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MUSEUMS VICTORIA
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The Royal Society of Tasmania acknowledges, with deep respect, the traditional owners of this land, and the ongoing custodianship of the Aboriginal people of Tasmania. The Society pays respect to Elders past and present.

We acknowledge that Tasmanian Aboriginal Peoples have survived severe and unjust impacts resulting from invasion and dispossession of their Country.

As an institution dedicated to the advancement of knowledge, the Royal Society of Tasmania recognises Aboriginal cultural knowledge and practices and seeks to respect and honour these traditions and the deep understanding they represent.

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Cover Image: Louisa Anne Meredith's *A Cool Debate* depicting green and gold frogs *Litoria raniformis* in her garden pond. Colour plate in Meredith's *Last Series of Bush Friends in Tasmania*, 1891, from The RST Art Collection.

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PAPERS AND PROCEEDINGS OF THE ROYAL SOCIETY OF TASMANIA

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THE ROYAL SOCIETY OF TASMANIA

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PREFACE TO THE THREE PALAWA LECTURES

In February 2021, The Royal Society of Tasmania offered a formal Apology to Tasmanian Aboriginal people (Palawa) and committed to building a respectful and supportive relationship. As part of honouring that commitment, the Society has invited Tasmanian Aboriginal scholars and leaders to present lectures in the RST lecture program. The three lecture transcripts published in this voloume of the *Papers and Proceedings* provide a range of Palawa perspectives on the progression towards establishing a Voice, treaty and truth-telling at the Tasmanian and national level.

In May 2017, over 250 Aboriginal and Torres Strait Islander delegates from all points of the Southern Sky gathered in Mutitjulu in the shadow of Uluru and put their signatures on a historic statement https://ulurustatement.org/the-statement/. The *Uluru Statement from the Heart* is an invitation to the Australian people from First Nations Australians to walk together to build a better future. It calls for enshrining a First Nations Voice to Parliament in the Constitution and the establishment of a Makarrata Commission for the purpose of treaty-making and truth-telling. Since the Statement was released the ensuing debate and discussion have focussed on its three principal components – Voice, treaty and truth-telling'

In 2021, the Premier of Tasmania, Mr Peter Gutwein, announced a consultation process with Tasmanian Aboriginal people aimed at finding a pathway to truth-telling and treaty. This consultation process was led by Professor Emerita Kate Warner AC and Professor Tim McCormack and their report *Pathway to Truth-Telling and Treaty* was delivered to the Premier in November 2021 containing 24 recommendations. Throughout 2022, the *Pathway to Truth-Telling and Treaty* recommendations were subject to much community discussion and critical evaluation and it was against this backdrop on 4 December 2022, Palawa leader Mr Rodney Gibbins presented his RST lecture. Mr Gibbins outlined the responses of successive governments to Aboriginal issues, reviewed the history of attempts to establish a treaty, and emphasised the need for the treaty and truth-telling processes to be Palawa-led.

In May 2022, the newly elected Prime Minister Mr Anthony Albanese declared his government would support the *Uluru Statement from the Heart* in full. On 23 March 2023, he announced holding a referendum proposing to alter the Constitution to create an Aboriginal and Torres Strait Islander Voice (Voice). If supported, an independent, representative advisory body for First Nations peoples would be established to make representations to the Parliament on matters directly relating to Aboriginal and Torres Strait Islander peoples. The Bill triggering the referendum i.e., the *Constitution Alteration (Aboriginal and Torres Strait Islander Voice) 2023* was tabled in Federal Parliament on 30 March 2023 by Attorney-General Mark Dreyfus. The Bill passed the House of Representatives on 31 May 2023, passed the Senate on 19 June 2023, and a national referendum was subsequently announced for 14 October 2023. For the change to the Constitution to be validated, the 'Yes' vote must gain a majority nationally as well as in at least four of the six states (i.e., a double majority).

Since its announcement, campaigning for voting Yes or No to the referendum question ("A Proposed Law: to alter the Constitution to recognise the First Peoples of Australia by estabishing an Aboriginal and Torres Strait Islander Voice. Do you approve this proposed alteration?") has continued to gather significant momentum across the nation, often with polarising views on either side of the debate. In July 2023, at the peak of state and national discussions, the Royal Society hosted two lectures on the Voice referendum delivered specifically by two Tasmanian Aboriginal leaders: Mr Michael Mansell (2 July 2023) and Ms Kerry Sculthorpe (30 July 2023). Both speakers presented different perspectives on the issues and provided a detailed overview of the history of the Tasmanian situation.

The three Palawa lectures were delivered in the Sir Stanley Burbury Theatre at the University of Tasmania, to a live and on-line audience and their recordings were made available soon after for public viewing on the Royal Society's YouTube Channel https://rst.org.au/royal-society-youtube-channel/. The transcripts, in their words highlight some of the key issues identified by the Tasmanian Aboriginal community in their fight for self-determination and recognition. The transcripts have been approved by the authors and are published with their permission.

The three lectures were delivered prior to the Voice to Parliament referendum being held on the 14 October 2023. The referendum was subsequently defeated gaining a national majority vote of 60.06% 'no' and 39.94% 'yes', with all states and territories voting 'no' except for the ACT whose votes contributed to the national tally.

Disclaimer: The Royal Society of Tasmania did not endorse a particular position with respect to the Voice referendum and the views and opinions expressed in the three lectures are those of the authors.

ABOUT THE SPEAKERS

Mr Rodney Gibbins has been an active campaigner for Aboriginal self-determination and recognition since the early 70s and for over 30 years served in Tasmanian and Commonwealth governments as a Senior Aboriginal Program and Policy Officer. On 3 July 2023, during NAIDOC Week (National Aboriginal and Islander Day Observance Committee), Rodney was named 'Tasmanian Aborigine of the Year' in recognition of his outstanding contributions to improving the lives of Tasmanian Aboriginal people. He has committed selfless and unwavering dedication to advance the negotiations for treaty by means of an Aboriginal-led process and has been a long advocate for truth-telling as the essential context for achieving Aboriginal rights and recognition.

Mr Michael Mansell is a renown and distinguished Tasmanian Aboriginal leader who, as an activist, barrister and solicitor, has worked tirelessly for decades for social, political and legal changes to improve the lives and social standing of Tasmanian Aboriginal people. Michael was named 'Aboriginal of the Year' at the 1987 National NAIDOC Awards, and played a crucial role in the drafting of legislation for the *Native Title Act 1993* that arose from the *Mabo v Queensland* case. His book *Treaty and Statehood: Aboriginal Self-Determination* was published in 2016.

Ms Kerry Sculthorpe is a senior member of the Palawa community and strong advocate for Aboriginal rights. Kerry has held elected and appointed positions in government policy and administration and was a former Senior Executive of the Australian Public Service. From 1990 until 1996 she was the Manager of the Aboriginal and Torres Strait Islander Commission in Tasmania, and from 1996 to 2003 a SES at ATSIC Canberra. Kerry has had a long participation in national forums on Indigenous education, health, land rights and legislation and served on the Federal Government's Voice Co-design Committee considering local and regional arrangements. In recognition of her outstanding achievements Kerry is listed on the Australian Women's Register.

TREATY AND TRUTH-TELLING: THE NEXT STEPS FOR TASMANIA

by Rodney Gibbins

Gibbins, R (2023). Treaty and truth-telling: the next steps for Tasmania. Transcript of lecture delivered to the Royal Society of Tasmania, 4 December 2022. *Papers and Proceedings of the Royal Society of Tasmania* 157: 3–8. Author: rodneygibbins@bigpond.com

INTRODUCTION

For over 60,000 years the Palawa people practised their sovereignty across this land of lutruwita. All of this changed with the arrival of the white man. The invasion radically changed us in a very short amount of time. Our culture was interrupted; our language, freedoms and country were taken from us, by force.

Since British invasion the continuing intolerant, contemptuous views and actions of successive governments rendered us almost voiceless and powerless on our own Country. This meant that Palawa ownership, use and management of lutruwita lands were usurped through violence, ethnic cleansing, and exile. During and after the invasion, the Sovereign entitlements of the Palawa over this country were ignored. During the next 200 years of the occupation of lutruwita, the Palawa have been discriminated against and denied their human rights to exist as a people, to own their own heritage, to live and be treated with dignity in their country.

THE FIRST WINS FOR JUSTICE

We began the contemporary fight back in the early 1970s by growing a political and social movement within the Palawa community that demanded recognition, acceptance, and autonomy. The community began to build its own political knowledge and skills as a people. After launching effective campaigns using the media and influencing public opinion, the views and attitudes of government and its institutions – along with those of the broader community – began to change. Our newfound political skills and ability to influence attitudinal and social change have had significant outcomes which have evolved over time.

The community have had several significant successes over the years such as the return and cremation of Truganini's remains, the repatriation of the so-called 'Crowther Collection', and the 1995 return of some Aboriginal lands. These successes were brought about by consistent and purposeful negotiations by the Palawa community. But all were different in the way they were received and dealt with by government.

Truganini, who witnessed the destruction of her people and her culture, pleaded with government authorities to have her ashes scattered in the D'Entrecasteaux Channel upon her death. This, as we know, did not happen. Her remains were exhumed and displayed in the Tasmanian Museum and Art Gallery (TMAG) for many years. There were protracted attempts to reclaim her remains to fulfill her wishes for burial at sea and these actions coincided with the renewal of the Palawa struggle for recognition and place.

In 1976, on the 100th anniversary of her death, Truganini was finally cremated, and her ashes scattered in the D'Entrecasteaux Channel. This was an enormous achievement for the Palawa community at that time. However, regrettably, and certainly inappropriately, it was the Tasmanian government that made most, if not all, the decisions about the timing and procedure of the ceremony. Only a small number of invited Palawa people and government representatives attended her cremation and the spreading of her ashes. It was a closed service that denied the Palawa community its right to farewell one of our most tragic and abused ancestors.

After this event, it was not long before the Palawa community turned its efforts to regaining more of their ancestors and releasing their spirits from their confinement at the TMAG. The TMAG and the government fought the community at every step of the way in returning these ancestors to our people. It took the intervention of Parliament in 1985, responding to ongoing demands from the Palawa people, to force the TMAG to hand back the Crowther Collection of Palawa remains, consisting of 33 skulls and three skeletons, to the Aboriginal community under its own terms and control. We were then able to welcome home our old people with our own spiritual and ceremonial practices, to set their spirits free at long last. This ceremony led to the largest gathering of Palawa in lutruwita in over 200 years at putalina/Oyster Cove to witness the cremation of our long-suffering ancestors.

During all this time the community continued to lobby and persuade successive governments for the return of land to the Palawa people. This culminated in the declaration of the *Aboriginal Lands Act 1995* to promote reconciliation with the Tasmanian Aboriginal community by granting Aboriginal people certain parcels of land of historic or cultural significance. Twelve areas of land were returned to the community. This included Mutton Bird and other islands in the Bass Strait, historic sites such as putalina/Oyster Cove, piyura kitina/Risdon Cove and three sacred cave sites. The Aboriginal Land Council of Tasmania (ALCT) was also established under this Act to hold title to the lands on behalf of the Palawa community.

It has been our experience that the personal commitment of political leaders has been pivotal in delivering these crucial advances in Aboriginal affairs in Tasmania – as well

as the critical reforms we have seen since then. It is also important to acknowledge the support and actions of many non-Aboriginal people and organisations around lutruwita who supported the Palawa community in its endeavours to gain the return of their ancestors, to protect our cultural heritage, and to secure land rights and correct injustices faced by the community. While there are too many to acknowledge here by name, I acknowledge the leadership of former Tasmanian Premier Mr Ray Groom who introduced the 1995 land rights legislation to Parliament after broad consultation around the state. I also acknowledge former Legislative Council member, the late Mr Tony Fletcher, who also championed the 1995 land rights legislation. The Labour governments of Premiers' Jim Bacon and Paul Lennon were equally effective in broad community consultations that led to the hand-back of Wybalenna on Flinders Island and truwuna/Cape Barren Island, the parliamentary apology to the stolen generations, and $5M compensation for the victims. At that time, you could say that engagement with the Palawa community was characterised by respect and understanding.

A LOSS OF TRACTION AND RESPECT

However, since 2016, in my opinion we have gone backwards, and this culture of respect and understanding has been sorely damaged. In 2016, then Premier Mr Will Hodgman delivered his ill-informed Australia Day speech where he announced a 'reset' of the government's relationship with the Palawa community. This 'reset' and the manner of its announcement and implementation led to exasperation and anger within our community and caused unnecessary and continuing conflict with the government. I believe this 'reset' was aimed at eroding advances made by the Palawa community and has undermined the collective approach to rights, justice, and advancement of Palawa people in this state.

The 'reset' agenda identified five priority areas which, according to Mr Hodgman, were informed by the themes of: recognition, reconciliation, and real outcomes. These areas were:

- a focus on Tasmanian Aboriginal history and culture in the delivery of the Australian curriculum,
- increased efforts to close the gap in disadvantage between Tasmanian Aboriginal people and the wider community,
- exploration of joint land management arrangements and review of the current land return model,
- constitutional recognition of Tasmanian Aboriginal people, and
- a new approach to Aboriginal eligibility.

The first two, Aboriginal history and culture in the curriculum and increased efforts to close the gap, are both important but should be considered as what government should be doing as 'business as usual'. In fact, the Tasmanian government had already signed onto *Closing the Gap* of life outcomes between Aboriginal and non-Aboriginal Australians eight years earlier in 2008. The third priority, exploration of joint land management arrangements and review of the current land return model, I suspect is more about breaking down the influence of ALCT and removing the Aboriginality requirements in the Act rather than positive revision of the Act to give benefit to the community. But it is the last two priorities that I will now explore more fully.

CONSTITUTIONAL RECOGNITION

In December 2016, the *Constitution Amendment (Constitutional Recognition of Aboriginal People) Act 2016* came into force. The Act inserted a new preamble into Tasmania's *Constitution Act 1934*, and I quote:

> *"And whereas the parliament, on behalf of all the people of Tasmania, acknowledges the Aboriginal people as Tasmania's First People and the traditional and original owners of Tasmanian lands and waters; recognises the enduring spiritual, social, cultural, and economic importance of traditional lands and waters to Tasmanian Aboriginal people; and recognises the unique and lasting contributions that Tasmanian Aboriginal people have made and continue to make to Tasmania."*

While these are nice words, they were drafted and inserted into the *Constitution Amendment Act* with no consultation with the Aboriginal people of Tasmania. The failure to consult with Palawa people – let alone seek and support the leadership of the Palawa people – actively disempowers our community and repeats the mistakes of colonial and 20th-century history. Moreover, a preamble in an Act, however nice, has no legal weight. It does not have separate legislative effect but is used merely for clarification or to give direction or purpose to the Act. It is neither enforceable nor justifiable in a court of law. It may recognise Aboriginal people, but it grants them no rights or legal recognition.

Aboriginal eligibility

Secondly, regarding the then Hodgman government's new approach to Aboriginal eligibility, its so-called 'inclusive eligibility policy'. It should be stated here that, historically, white society has always exerted its ethnocentric opinion about who or what we are. No other people in Tasmania are defined by government, only the Palawa.

Traditionally, to be eligible to access Tasmanian Government Aboriginal and Torres Strait Islander programs and services, you must be an 'Aboriginal or Torres Strait Islander person'. This means you must:

- have Aboriginal and/or Torres Strait Islander ancestry,
- self-identify as an Aboriginal person and/or Torres Strait Islander, and
- be recognised as an Aboriginal person and/or Torres Strait Islander by the Aboriginal or Torres Strait Islander community in which you live or have lived.

This is the same three-point legal test developed by Australian courts over many years and is used across all Commonwealth agencies.

The Tasmanian government agencies, however, only require you to complete a form consisting of a statutory declaration and a confirmation statement completed by a registered Aboriginal organisation whose primary purpose is to support Aboriginal people to determine eligibility. This change in process to Aboriginal identity and eligibility in Tasmania completely undermined the previously sound approach, accepted by Aboriginal communities across Australia. In Tasmania the requirement for organisational confirmation of Aboriginality resulted in such a sharp increase in requests that many organisations stopped providing the service unless they were paid to do so. Ironically, the service was previously provided free-of-charge by the Office of Aboriginal Affairs (OAA) supported by the Tasmanian Archives and Heritage Office, but this was discontinued after 2016.

It seems, however, that the three-point legal test has not been fully applied. In most cases, either confirmation by an organisation or self-identification are sufficient to satisfy Tasmanian Government agencies that a person is an Aboriginal person. If a person or government agency has concerns that a person may not meet the three-point requirement, what happens? I can't find any requirements that evidence be produced to confirm a person is an Aborigine.

This raises serious questions about due diligence when assessing claims to taxpayer-funded programs and resources. More importantly, it places at risk the transfer of Palawa lands to non-Aboriginal people who are claiming to be Palawa. And it calls into question who the government is speaking with when it claims to be consulting with Palawa people. These serious issues have arisen because the critical stages of confirming Aboriginal identity have been ignored – including recognition by the Aboriginal community itself. Why? I can only conclude it is because the government continues to hold the ethnocentric view that it decides who we are, and we cannot be trusted to do this ourselves.

THE ULURU STATEMENT FROM THE HEART

In 2017, the *Uluru Statement from the Heart* was proclaimed by representatives of Aboriginal and Torres Strait Islander peoples from across the nation. The statement asserts the Sovereignty of Aboriginal people over the Australian continent and its adjacent lands. It affirms that this Sovereignty has never been ceded or extinguished and that it co-exists with the Sovereignty of the Crown. The statement seeks three reforms to empower Aboriginal people to take their rightful place in their own Country and to have power over their own destiny:

- a 'First Nations Voice' enshrined in the Australian Constitution,
- a Makarrata Commission to supervise the process of agreement-making between governments and First Nations peoples, and
- endorses processes to ensure truth-telling about our history.

The Federal Minister for Aboriginal Affairs The Hon. Linda Burney MP has stated that the Uluru Statement will be enacted in full by the Albanese government. In June 2022, they committed to a referendum on the First Nations Voice in its first term of Parliament. In July, Aboriginal Senator Patrick Dodson was appointed Special Envoy for Reconciliation and the Implementation of the Uluru Statement to deliver on this promise.

The Voice

The Voice is the element of the Uluru Statement that has gained significant momentum over the last few years. Truth-telling has gained some small traction in the broader community, whereas the Makarrata Commission or treaty development is largely unknown. Personally, I am a supporter of the Voice, but believe there are critical questions to ask: What is the Voice? What is it meant to do? What powers will it have? How will delegates be selected and how do we guarantee community authority over the people who will be representing us?

These questions need to be answered before we go to the Australian people and seek their support. Since Federation, there have been 44 proposals for Constitutional change. Only eight of these have been successful. One of these was the 1967 referendum to allow the Commonwealth to enact laws for Aboriginal people and to include Aboriginal people in population counts. That referendum received an historic 90.77% of the vote and was supported by all states and territories. I would hope for a similar success for the Voice, but at present I do not think this is possible.

The reconciliation bridge walks of 2000/2001 demonstrated that many in the Australian community are committed to reconciliation and justice for Aboriginal people, but this is by no means universal. When the referendum is announced, the forces of racism will be loud and divisive. If the Voice is to succeed, it must be clearly defined and communicated to the Australian people so that any campaign of fear or – perhaps more invidious – apathy, cannot prevail.

The Prime Minister Mr Albanese has stated that the referendum to enshrine the Voice should be 'simple and clear', that the question put to the Australian people requires a simple 'Yes or No' answer. He has suggested a question like 'Do you support an alteration to the Constitution that establishes an Aboriginal and Torres Strait Islander Voice?' It is hard to believe that the Australian people will vote for a Voice when they do not know what it is, why it should be pursued through Constitutional amendment and what it will achieve.

The Commonwealth government already has the power to establish a Voice and does not need a referendum to make this possible. Apparently, the thinking, which has not been expressed publicly, is that endorsement of a Voice via a referendum will secure the entity forever. But this is naïve. Referendum outcomes can circumscribe government actions, but they do not necessarily commit governments to action. They merely give Parliament a power to do something 'if' the Parliament wants to. Not unlike the

current situation, it will be the Parliament that will have the power to pass laws with respect to the composition, functions, powers, and procedures of the Voice. So, it would be fair to say this Voice will operate and function at the will of government.

Additionally, there is nothing permanent about the Voice established by a referendum. For example, Section 101 of the Constitution provides 'there shall be an Interstate Commission' but none exists nor has existed since 1950. A referendum for a Voice does not guarantee a Voice will survive. What will happen when the Voice is drowned out or reduced to a whimper, what good will that Voice be then?

What a Voice will achieve, is yet unclear. It appears that the Voice model cannot return land, cannot make laws, cannot protect heritage, cannot deliver services, cannot administer revenue. To date, there have been no nationwide discussions on what a Voice will look like, or its power to make and enforce decisions or any discussion specifically with Aboriginal community as to their views about the Voice. Without a transparent nationwide debate and without clear communication and education, the referendum may not succeed – and the outcomes may not meet the aspirations of Aboriginal people.

Truth-telling and treaty

A positive outcome from the Uluru Statement is its entreaty to states and territories to take steps of their own to develop policies on treaty and truth-telling. In Tasmania, we must progress both these matters, led by Palawa and fully and appropriately resourced by government. In November 2021, the Liberal-led government published the report *Pathway to Truth-telling and Treaty*. The report has had a mixed reception. My view is that it shows bias towards a select few opinions, lacks a strong positive outlook, and fails to suggest ways forward that can truly ignite discussion and engagement with the Palawa and broader Tasmanian community. Despite these shortcomings, the report could make possible what has never been possible in Tasmania before – a treaty and the truth.

Along with the Palawa community, I support some of the report's recommendations that deliver positive next steps. A working group of leading Palawa representatives would begin negotiations for the establishment of truth-telling and treaty commissions, leading to:

- a truth-telling commission whose makeup should be all Palawa, and
- framework legislation establishing a treaty commission comprised predominantly of Palawa.

In his last *State of the State* report, Premier Mr Gutwein provided an update following the release of the *Pathway to Truth-telling and Treaty* report. He advised the Parliament that, while there were a variety of views, the feedback he had received indicated broad support to develop processes to establish truth-telling and treaty. He suggested the feedback was clear that both must be Aboriginal-led and have Aboriginal ownership. He explained that these would not be easy tasks and it would require goodwill from all sides to take these matters forward. Consequently, he decided that the next step would be to establish an Aboriginal advisory body, representative of the Tasmanian Aboriginal community, which would work with the government through a co-design approach to establish both processes. He went on to suggest the body would also provide advice on the other recommendations in the report and on matters that affect Tasmanian Aboriginal people.

This advisory body, in my view, must in no way pre-empt any recommendations or decisions that arise from the proposed treaty and truth-telling commissions. Should it do so it would completely de-value and undercut the work of these commissions. The Premier Mr Gutwein also stated that the government was firm in its view that the truth-telling commission, when established, would not be tasked with determining Aboriginality or eligibility, and that the government remained committed to its current (and what it calls) inclusive eligibility policy.

Taking Aboriginal identity off the table is to again deny Palawa leadership and to impose a white people's agenda on our people. Importantly, our identity, who we are, is a crucial part of truth-telling. It goes to the heart of our history, before and after the arrival of white colonists, and is key to how we direct our own future. If we cannot say who we are, we cannot in any way speak the truth. So, where do things now stand in relation to truth-telling and treaty?

The Minister for Aboriginal Affairs Mr Roger Jaensch arranged a meeting on 29 July 2022 with organisations registered with the Office of the Registrar of Indigenous Corporations (ORIC) and invited them to send two members from each organisation to attend this meeting. The Minister then invited attending organisations to nominate two people each from whom the Minister would choose to sit on his Aboriginal Advisory body to develop a way forward for treaty and truth-telling processes. Those names were forwarded to the government and considered by the Minister under a set of criteria known only to him. The Minister announced an organisation-based committee of six people selected by government on 2 December 2022. This committee does not have the support or respect of the Palawa community as it has been government chosen and not community elected. And there are no guarantees that all these people are indeed Palawa. Once again, the views and wishes of the Palawa people have been totally undermined. How then does this government led process fulfill the government's promise for it to have Aboriginal ownership and be Aboriginal led by representatives of the Tasmanian Aboriginal community when it does not have the authority, respect, or cultural license to speak on behalf of the Palawa people.

A community meeting arranged by the Tasmanian Aboriginal Centre was held on the same day as the Minister's 29 July meeting. The meeting was chaired from Launceston with around 150 Palawa community members joining online from Burnie, Hobart, and Cape Barren. They echoed concerns that Indigenous community voices and perspectives were not being heard or sought. The community felt it was being ignored with the results that, once again, Palawa were being removed from power and pathways to justice.

To overcome this, at that meeting the community encouraged the Premier Mr Rockliff to take over the Aboriginal Affairs portfolio and chose 11 delegates to form a group to represent them and to negotiate a plan for treaty and truth-telling in lutruwita. The delegates were chosen from across lutruwita, including the islands. They have adopted the Palawa name *tuylupa tunapri* – 'to light the fire of understanding'. It is important to note that *tuylupa tunapri* are community representatives of the whole Palawa community. They represent the genuine voice of the community and are not constrained or directed by the views or interests of individual organisations. The *tuylupa tunapri* delegates are keen to work with the government and other groups to legislate for a treaty and to establish a truth-telling commission, which tells the truth of our history, people, culture, and country. The group has invited the Premier to meet with them on several occasions, but to-date he has yet to do so.

It is my strongly held belief that a treaty informed by community input will change the political landscape for Palawa, giving them more power and control over their own Country and their own destiny. A treaty informed by community input and a truth-telling process will help identify and eliminate the barriers that have prevented Palawa from achieving social, economic, and cultural equity. The symbol of a treaty has value, but it is the content of the treaty that must be carefully crafted if it is to build justice and equity. This treaty, to have real and enduring impact, would include confirming and acting on those statements in the preamble of the Constitution that acknowledges the Palawa people as Tasmania's first people and the traditional and original owners of Tasmanian lands and waters. Including recognition and acceptance of the enduring spiritual, social, cultural, and economic importance of traditional lands and waters to Palawa people.

Further areas that should be discussed for inclusion in a treaty are Sovereignty, power sharing, ownership of Aboriginal heritage and culture, meaningful land returns, and reparation. Sovereignty is the foundation stone for the implementation of a treaty and would be expressed through sharing land, power, and wealth in Tasmania. It would also confirm the Sovereignty of Palawa as a people which could lead to empowerment and self-determination for the Palawa community.

The treaty would support meaningful land returns which could include all Crown Lands being returned under Aboriginal title. It may also include land brought on the open market for cultural protection or economic development. There would also need to be agreed financial means to protect, repair and develop returned land. Any treaty would include Palawa ownership of Aboriginal heritage and culture in Tasmania. This would incorporate cultural authority over all returned lands including over national parks and other public lands not yet returned. This would also include the right to undertake cultural practices such as fishing, hunting and other social practices on lands and waters in this state. Reparations would include a guaranteed permanent financial resource, for example 3% of GDP. This would be in part compensation for loss of land and reparation for the destruction of a vibrant living society. One suggestion regarding sharing of power is to have several designated Aboriginal parliamentary seats at the Commonwealth and state governments level.

Certainly, a treaty between the state of Tasmania and the Palawa is supported by Palawa people, and potentially many Tasmanians and therefore we would expect such a treaty would dignify, honour, and do justice to the Palawa. The process for a treaty should also be collaborative and respectful. It should provide equal resources to the state and to the Palawa to research, consult, negotiate, and seek expert opinion. State-wide engagement with the Palawa community is vital – and should be fully resourced to be undertaken by the community itself.

While truth-telling and treaty are linked, the commissions for each should be totally separate. Truth-telling is long overdue. The need for truth-telling has been a consistent and strongly expressed view of the Palawa community in Tasmania. It will provide a better understanding of the injustice and intergenerational trauma suffered by the Palawa. This is not the 'black armband of history' but the truth we wish to speak and that all Tasmanians must hear. As a society we must demonstrate the courage to speak and the humility to listen.

The truth-telling commission, appropriately led, structured and resourced – will create a permanent and official historical record of the past. It will clarify and amend the current historical record, firmly rejecting the myth that with the death of Truganini on 8 May 1876, that over 60,000 years of Palawa society and culture was extinguished. It will shine a light on the genocide and rape of our people, but also on the extraordinary acts of Palawa resistance, resilience, and survival. It will reveal the true actions of successive Tasmanian governments and the complicity, silence, and ignorance of the broader community. As a result, it will help form our collective story from colonisation and dispossession to hopefully a future that is characterised by mutual understanding and healing.

In the context of this truth, the commission should be empowered to make recommendations on redress and reforms between Palawa, government and the broader Tasmanian community. It should make recommendations for healing, including legislative, education and systemic reform and on other specific matters that may be included in treaty negotiations. Importantly, the story laid bare by the commission should compel the state of Tasmania to offer its deepest apologies to the Palawa for past and ongoing injustices, abuse, and discrimination.

However, the success of the commission will depend on how it is structured, resourced, and empowered. The commission should have the leadership of Palawa people who have the respect and recognition of our community. It should be resourced to fully engage with the community, provide a safe place for those speaking out, provide appropriate support for those experiencing trauma, and acquire the expertise it needs. It must be able to compel government bodies and officials including politicians to give evidence – and to provide documentation – on the 200 years of oppression of the Palawa in Tasmania.

CONCLUSION

The Palawa people have been subjected to invasion, genocidal practices and oppression perpetrated by or sanctioned by the invader – both colonial governments and the modern state. Moves in Tasmania to put in place truth-telling and a treaty suggest that Palawa and non-Palawa Tasmanians have finally agreed that it is time to address these issues. It has been a long time coming and is a matter of urgency.

The way forward, is clear. Pursue treaty and truth-telling led by Palawa, informed by Palawa and with the heart of Palawa at the very centre. These will allow for our own statement from the heart. The government needs to demonstrate goodwill as we embrace this historic moment. They should desist from imposing on Palawa people white definitions of who we are. Put into abeyance any proposed legislative changes to the *Aboriginal Lands Act* particularly those around Aboriginal eligibility requirements. Proceed as quickly as possible with a new *Aboriginal Heritage Act* to halt the continued destruction of Aboriginal heritage and culture. Recognise and resource the community-elected representatives within *tuylup tunapri*.

The moral wellbeing of Tasmania is poorer for its failure to come to terms with its true past and the persistence of racism and denial in the present. The ongoing failure to respect the humanity of the Palawa diminishes us all as people and a society. To know the story of the Palawa will allow us all, as Tasmanians, to build a new story of mutual respect and a hopeful future in which all are equal and equally valued. Tasmania has never reached a just and honourable position with the Palawa community. Perhaps, now is the time.

(accepted 3 August 2023)

EMPOWERING ABORIGINES: VOICES INSIDE PARLIAMENT OR ADVISERS OUTSIDE? VOTING 'NO' TO THE REFERENDUM IS A VOTE OF SUPPORT FOR ABORIGINAL SELF-DETERMINATION

by Michael Mansell

Mansell, M (2023). Empowering Aborigines: voices inside Parliament or advisors outside; voting no is a vote of support for Aboriginal self-determination. Transcript of lecture delivered to the Royal Society of Tasmania, 2 July2023. *Papers and Proceedings of the Royal Society of Tasmania* 157: 9–12. Author: michael.mansell@bigpond.com

INTRODUCTION

In 1979 the National Aboriginal Conference (a national body of elected aboriginal people) called for a treaty. The Prime Minister at the time, Mr Malcolm Fraser, indicated he was happy to discuss a treaty with the NAC and although these discussions did not eventuate, at least the topic was raised.

In 1996 Sir William Deane, the Governor General of Australia, made the statement that Australia was the only country in the Commonwealth that had never made a treaty with its original people. In 1998 the Barunga Statement in the Northern Territory raised the question of a national treaty with the Aboriginal nation, called a 'Makarrata' in their local language. The Prime Minister at the time, Mr Bob Hawke, said he was willing to talk to Aboriginal people about a treaty but again no discussions eventuated.

During the period when Mr Hawke was Prime Minister, the Aboriginal and Torres Strait Islander Commission (ATSIC), that had existed up until 2004, also campaigned for a treaty. In the lead up to the 2016 federal election, Mr Bill Shorten, the then Labour leader during that election campaign, said that he was willing to talk to Aboriginal people about a treaty. Mr Shorten did not win the election, but in the following year, 250 Aboriginal delegates from around the country, presented the *Uluru Statement from the Heart* to non-Indigenous Australians calling for acknowledgement of Aboriginal Sovereignty, a treaty, truth-telling and a Voice to Parliament. It may well have been on the basisz of that history of treaty, that the current Prime Minister Mr Anthony Albanese announced in the 2022 budget last year, that $5.8M would be set aside for the development of a treaty between the Australian nation and the Aboriginal and Torres Strait Island people.

Barely a month after the Prime Minister made this announcement, Mr Tony McAvoy, Senior Council Aboriginal Barrister, delivered his report about a treaty in the Northern Territory; a report that many had waited for with a good deal of apprehension. Given the size of the Northern Territory, it was inevitable the report was going to raise similar issues to those needed for a national treaty. The McAvory report naturally said land would have to be returned to Aboriginal people (otherwise it would not be a treaty). It also stated that Aboriginal people should have law making powers, and wherever possible Aboriginal communities should have autonomy over health, housing, education, land use and planning, and (if I took some liberty with the report), perhaps also policing and customary law. This report also laid out broad parameters for hunting and fishing rights (which are important to Aboriginal people) and other issues including cash reparations.

Based on the McAvoy Report, most Aboriginal groups around the country expected they would receive the $5.8M budget from the Prime Minister to hold a national summit to consider the report, and by negotiations with a range of Aboriginal people at that summit, decide on the parameters that could be applied to the possibility of a national treaty. These negotiations did not happen because by September 2022 the Prime Minister had announced to the Australian people that, during his term of office, his government would either deal with the treaty and truth-telling *or* a referendum for the Voice to Parliament, but not both. The Prime Minister's position suddenly polarised the Aboriginal community between those who expected to work on all the matters i.e., treaty, truth-telling via the legislative track, and Voice to the Parliament through a referendum simultaneously and that neither of those topics would take precedence over the other. Suddenly the Prime Minister was telling us – you've got to choose – and if you support the Voice you are not going to get a treaty during this term of office.

ABORIGINAL SOVEREIGNTY

The McAvoy Report did not delve into sovereignty of the NT or the Commonwealth or Aboriginal sovereignty or the relationship of theoretically competing claims to supreme rule. Keeping it simple, Aboriginal Sovereignty has existed since time immemorial. A powerful European nation took over and its settlers established a white Australia nation in 1901. The sheer domination by whites has prevented Aborigines from exercising little more than a diminished sovereignty (in discrete communities, Aboriginal passports, political assertion of continued black sovereignty) over the past 250 years but that does not mean Aboriginal sovereignty no longer exists. France during the second world war is analogous. France was a sovereign country but as Germany had assumed power, France could not exercise its normal sovereign rights. It did not mean the French had lost their sovereign rights altogether. When German dominance

ended, France resumed its sovereignty over its people and its territory. The same principle aplies to Aboriginal people.

How would Aboriginal Sovereignty be expressed in 2023 when you have 25 million people living in the country and Aboriginal people are such a minority? We anticipated the Aboriginal Sovereignty would find expression through different provisions of any treaty and a range of capacities that Aboriginal people would have, for example as the McAvoy Report mentioned, i.e., autonomy over housing, health, and education, etc. In this context many say 'it doesn't make sense' – how can you have Aboriginal Sovereignty in a treaty when there is only one sovereign in the country! But this is not true. The Federation of the Commonwealth of Australia is made up of seven sovereigns. Each of Australia's six states derive their original power from the colonies that Britain had enabled autonomous powers which then became sovereign. Those six states (i.e., colonies) agreed to form a federation and as part of that process would devolve some of their powers to a federal Parliament. Certain sovereign powers were retained by the states and others were handed to the Commonwealth. For example, none of the states can raise an army, or represent the Commonwealth on international relations, etc. In 1998, the Northern Territory Government pushed for a referendum to become a state and had it been successful, there would have been eight sovereigns in Australia not seven. Aboriginal people make the point that if there are already seven sovereigns in Australia, and in 1998 could potentially have been eight, surely there is capacity to recognise Aboriginal sovereignty working in conjunction with the other powers.

Treaty or Voice

Now that the Prime Minister has announced we will either have a treaty or a Voice to Parliament, but not both, let's compare what each offers Aboriginal people. The advocates for a Voice have expressed strongly all the positive things this option offers, for example: it will change the face of Australia, diminish racism, and provide Aboriginal people with a voice. This view is made even though Aboriginal people are currently able to express their opinions and views publicly including in the media every day and there are ten Aboriginal politicians currently in the federal Parliament, one being the Minister for Aboriginal Affairs. Is it a question of having a Voice or being listened to? How long have we called for a change to the date of Australia Day from 26 January; an advisory body will not be asking for anything different to the claims Aboriginal people have been and are making now.

The Voice supporters claim this will make a positive difference to the lives of Aboriginal people and if this were true then naturally, we should all support it. But is this true – or too good to be true? Voice advocates claim it will give Aboriginal people a 'place at the table' which suggests the decision-making table. If any federal Parliament is going to pass a law, the House of Representatives will vote on it first. An Aboriginal advisory body would not be able to sit in the House of Representatives, it is unconstitutional. If the Bill then goes to the Senate, no advisory body can sit there to help pass legislation. While the advisory body can give advice, it cannot sit at the table of executive government, because this is the Cabinet. So, it is hard to see what decision-making power an Aboriginal advisory body will have. It can make comment and advise on issues that do or might affect Aboriginal people but its limitations in power are due to it being located inside federal Parliament with no jurisdiction to comment on issues that happen at a state level. Most of the services that affect Aboriginal people are state driven not Commonwealth. The police, the state laws, prisons, health, housing, education, etc., – are all state driven. The delivery of child protection and welfare services is state driven. Such an advisory body would not have jurisdiction to comment on most of those matters that affect Aboriginal people but be limited to talking about matters inside the federal Parliament or federal executive.

In comparison, a national treaty would have the force of a federal law and jurisdiction across the whole of Australia. It would be binding on the Commonwealth and State governments, local government, the courts, police, and the public. When it comes to the scope of a treaty conferring rights on Aboriginal people and imposing obligations on a range of entities, it is a far superior mechanism than an advisory body operating within a very limited sphere which cannot pass or stop a federal law. An advisory body cannot deliver services, nor build a single house for Aboriginal people, nor raise taxes or distribute resources. It cannot supervise its own composition (which would be decided by Government). Proponents of the Voice are not telling the Australian people these deficiencies. It may be they potentially have been 'spooked' by the 1999 referendum of the Howard Government when too much detail was given on the model for becoming a republic which subsequently divided the republican movement, and the referendum was lost. Advocates for the Voice are therefore over-zealous or exaggerating the capacity of an advisory body and not its limitations.

The Prime Minister already has the power to establish an advisory body and probably would have broad support from the public and Aboriginal people to do so. It could be set up administratively, like other Prime Ministers have done in the past, and legislatively because the government has the numbers to pass it through the Lower House and Senate. The South Australian Government have already legislated for their 'Voice Advisory Body'. But the inclusion of the referendum in the discussion about how best to empower Aboriginal people complicates matters and may well be one of the reasons why the polls are starting to move away from support for the Voice to Parliament.

Everyone likes the idea of Aboriginal people being empowered but putting this in the Constitution raises other constitutional issues. Murray Gleason, Chief Justice of the High Court in 2007, made these very salient comments, that probably reflect many of the concerns for the Voice being raised today.

> *"The Australian Constitution was not created for the purposes of protecting the rights of individuals. It was not the outcome of a revolution or a struggle against*

oppression. The Australian Constitution was designed to give effect to an agreement for a federal union of the peoples of formerly self-governing British colonies."

In 1901 those who designed the Australian Constitution simply drew up the document which chartered a bundle of powers to the federal Parliament and those retained by the states and established the High Court of Australia to resolve dispute about any grey areas. The point the Chief Justice is making is that if you want to progress the rights of individuals or groups of people, don't go through the Constitution but through legislation.

One of the unintended effects of the proposal for the entrenchment of an Aboriginal advisory body in the Constitution goes to a discussion about the political rights of Australian people and the collective political rights of Aborigines. The Constitution was drawn up based on representative democracy and gives a political guarantee that every so many years the people of Australia will have an election and those voted in will reflect the collective values and aspirations of the voters. Aboriginal people don't have the same guarantee because they don't have the numbers. This refers to collective not individual rights. Aboriginal people can – and do – stand for Parliament. When we refer to collective guarantees of political representation in the Parliament, I mean Aboriginal people do not have sufficient numbers to know that we can elect our people who will reflect our values and aspirations. It could be changed through a simple amendment to the *Commonwealth Electoral Act*. While this not part of the Uluru Statement – I have proposed many times that like the Māori in New Zealand and the Indians in the American State of Maine (who have designated seats set aside for them) - the purpose is to give a guarantee to the Indigenous people that their collective right to vote someone in with their values and aspirations the Parliament – is guaranteed under the Constitution. In Australia, we can amend the Commonwealth electoral laws to have one Aboriginal from each the six states elected by Aboriginal people every time there is an election into the Senate. There would still be 12 senators from the states, but in each state one would be designated for Aboriginal people. Why is that so important in the context of the Voice and the referendum? Because for the first time it would give us the same guarantee that Australians have enjoyed, knowing in advance that we can elect one of our people with the same values and aspirations. The advisory body does not guarantee indigenous peoples a proportionate share of power – it cements permanently in the Constitution a subordinate role as mere advisers.

How would the people of Australia feel if, because of some legal technicality, your right to elect people to make decisions for you was removed – and your vote only enabled you to elect people who advised! If you wouldn't accept it, why should we! Why should Aboriginal people suffer this continually discriminatory, second rate, poor choice proposals yet this is what the propaganda and emotional blackmail are pointing towards.

A strategy of the 'pro-Voice' advocates for the referendum is the demonising of anyone who doesn't support the Voice or even questions it. This tactic is emotional blackmail, i.e., to feel guilty and anti-Aboriginal if you don't support it, or to feel warm-fuzzy by thinking you have played your part by supporting Aboriginals. The moment the Liberal leader Mr Peter Dutton declared his opposition to the referendum, those that later agreed were immediately accused of siding with Mr Dutton, when that is not the case.

What are the chances of a referendum succeeding?

For those who are unconvinced about my arguments or those of others around the country, then the referendum has a good chance of succeeding, but it is Aboriginal people who will be left with the fall-out.

The referendum should never have proceeded. If the Government wants an advisory body, then it should set one up. The implications of a referendum have not been properly considered and while it is on the table then the issues of treaty and truth-telling cannot be progressed. In September 2022 the national polls showed 64% of the population supported a referendum to entrench an advisory body in the Constitution. By February 2023, support had declined to 56% and by late June 2023 to 43%, indicating the majority of the population were not supportive. From December 2022 to June 2023 those in Tasmania who supported the Voice, had dropped 30%. The 'Message Stick' (a pro-Voice group) who polled Aboriginal people found 25% of Aboriginals surveyed said they did not support the Voice, and the number who said 'I don't know enough about it' was 45%. So, of the Aboriginal population surveyed, if these polls are an accurate reflection, then 70% did not indicate outright support the referendum for the entrenchment of an advisory body in the Constitution.

Where to from here?

The Prime Minister has the Parliament at his disposal. At any time, he can get progressive legislation through the House of Representation, because he has the numbers. He can also get the Australian Greens Party and Independents in the Senate to vote for anything that is positive for Aboriginal people through the Parliament. He can put up legislation immediately to start the treaty process – or set up a truth-telling commission, or amend the *Commonwealth Electoral Act*, all would pass through the Parliament, because he has the numbers to do it. But he will not pay attention to any of those matters while the referendum is on the table. So where does that leave Aboriginal people? For those of you who were not aware of the issues I have raised and may now want to defer until they have been sorted out, then write to the Prime Minister! Ask him to make all these changes together as a condition of voting in favour of your referendum. Or write to your local politician or the media.

Out of the national discussion so far, the advocates for the Voice are gaining momentum. With the funds they have available they will flood you with more of the exaggerated information about the capacity of an advisory body which simply is not possible in the mechanisms proposed. I will continue to campaign and hope that the Prime Minister, if

he must proceed with the referendum, at least commences discussion on the other issues I have raised and not defer them. I urge all of you not to just appease your conscience by voting for something that 'sounds good' but look at the facts and support Aboriginal people to get something that will make a real difference to our lives.

(accepted 3 August 2023)

AN EXPLORATION OF THE VOICE TO PARLIAMENT – HOW WE GOT HERE, AND WHAT WE MIGHT EXPECT AFTER THE REFERENDUM

by Kerry Sculthorpe

Sculthorpe, K (2023). An exploration of the Voice to Parliament – how we got here, and what we might expect after the referendum. Transcript of lecture delivered to the Royal Society of Tasmania, 30 July 2023. *Papers and Proceedings of the Royal Society of Tasmania* 157: 13–17. Author: kerrysculthorpe@gmail.com

ACKNOWLEDGMENT

I would like to take a moment to acknowledge that we are meeting on the lands of the Muwinina here in nipaluna/Hobart. The Muwinina formed part of what we now refer to as the southeast nation. Sadly, neither the Muwinina nor any other members of the southeast nation leave any descendants. They did not survive the invasion of the British.

These lands have been inherited by the Palawa and have never been surrendered. This really means that we are living under occupation. We remember with great respect those people who came before us, and our fallen, who trod so lightly on these lands.

INTRODUCTION

Thank you for inviting me to speak about an issue that is topical today. And thank you to the audience, both here in person and those listening in, for your interest. I am not the first of my family to stand before the membership of the Royal Society of Tasmania. My two times great grandmother, Fanny Smith, did so in 1899 when she agreed to be recorded speaking and singing in her mother tongue. I think it pleased her that she was of interest to the Royal Society because she was, at the time, considered to be the last living example of her race and, therefore of some considerable scientific interest. Now, here I am. Neither she, nor I could have imagined such a thing! I think she would have been amused.

We are now going to have a referendum to decide whether a new section should be added to the Australian Constitution to recognise Aboriginal and Torres Strait Islander people as the First Peoples of the country by enabling the Parliament to legislate to establish a body which may give advice to it on matters affecting Aboriginal people and Torres Strait Islanders.

Six years on from the *Uluru Statement from the Heart* many are wondering what drove those people in the desert, to think that asking the permission of the Australian people, about something so innocuous was a good idea. The proposal could not have any impact on the daily lives of 97% of the population yet they are the ones who will decide if a modest, in fact timid, proposal, which concerns 3% of the population, will be permitted.

How did we get to this point!

There is a long history of recommendations to government regarding the situation of Aboriginal people since we were dispossessed of our lands, and I want to mention some key moments. Forty years ago, the then Prime Minister, Mr Bob Hawke promised a treaty with the Aboriginal people would be negotiated by 1990. A powerful scare campaign soon put paid to that idea. Then the early 1990s saw several landmark events which I will now mention.

The Aboriginal and Torres Strait Islander Commission (ATSIC) was established to deliver self-determination.

The Royal Commission into Aboriginal Deaths in Custody presented its report to the Commonwealth government. The report contained 339 wide ranging recommendations aimed at reducing the number of Aboriginal people who were taken into custody and who died in the custody of the state. Many of them were directed at addressing what were described as 'underlying issues.' At the time Australia had the highest rates of incarceration of indigenous people in the world. There was, for a while, a flurry amongst government departments to get the recommendations ticked off but most were never properly implemented and before long all the activity just faded into oblivion.

The early 1990s also saw the landmark High Court decision in the *Mabo* case which confirmed that Australian law could accommodate native title to land.

In 1991 the government decided that Aborigines might be well served by a nation building exercise which would unite Australia. The catch phrase would be 'Reconciliation' and it would have a program of activities over a ten-year timeframe. A reconciliation council was established, and its membership of Aboriginal and non-Aboriginal people appointed. It was chaired by the now Senator Mr Patrick Dodson. The Council initiated many different activities designed to bring black and white Australia together, to help white Australia get to know and understand Aboriginal people. It culminated in the highly popular walks across bridges in capital cities across the country showing support for Aboriginal people – or perhaps more accurately, for reconciliation.

In the course of its work the council recommended to government that Aboriginal and Torres Strait Islander people should be acknowledged in the Constitution. This seems to be the first mention of such a proposal in recent

times and was an era where Aboriginal people held some hope for change to better their lives.

The 2005 report of the Social Justice Commissioner brought attention to the worsening situation of Aboriginal people across all social indicators and gave rise to the *Close the Gap* campaign. This campaign which continues to this day at a snail's pace, and in some areas, the gap is now widening.

In 2007 an inquiry established to investigate alleged sexual abuse of children in the Northern Territory presented its report to the NT government. It made 97 recommendations about improving the standard of living and the services available to Aboriginal communities. Many of the recommendations focused on prevention and stressed the importance of working alongside Aboriginal people and communities.

The Commonwealth chose to respond to that report by suspending the *Racial Discrimination Act 1975*, sacking Aboriginal community councils, replacing them with public servants and sending in the army and police to address the alleged bad behaviour and regain control. During this time the notion of having Aboriginal people recognised in the Constitution remained quietly on the agenda but all efforts now seemed to focus on behaviour management.

EFFORTS TOWARD CONSTITUTIONAL RECOGNITION

In 2011 the Commonwealth established an expert panel on the issue of constitutional recognition of Aboriginal people. Its membership comprised both Aboriginal and non-Aboriginal people and it was tasked with leading a 'wide ranging consultation and engagement program ...to build consensus on the recognition of Indigenous people in the Constitution.' The stated aim was to improve the relationship between Aboriginal people and the Australian people with a focus on nation building and social cohesion.

The outcome of the expert panel's report was a further campaign by Reconciliation Australia (formerly the Reconciliation Council) called *Recognise*. This campaign, started in 2012 and, funded by the Commonwealth, ran until 2017 when government funding ceased.

By 2016 the Commonwealth had appointed a 16-member Referendum Council comprising public figures both Aboriginal and non-Aboriginal, to oversee consultations with the Aboriginal people and others about the same subject. So, now after a series of initiatives spanning over 20 years of government funded activity around recognising Aboriginal people and Torres Strait Islanders in the Australian Constitution, some might observe that it was all carefully shepherded by prominent public figures ensuring the Aboriginal members didn't become too ambitious. There was never a committee comprising only Aboriginal people.

The one constant during these years of consultation was that Aboriginal people wanted more than token recognition in the Constitution. There had been frequent calls for another national organisation since the abolition of ATSIC had taken Aboriginal issues out of the media and seen a shift away from notions of self-determination and social justice.

Throughout 2016 and 2017 several curated 'dialogues' overseen by the Referendum Council were held across the country on the question of constitutional recognition. It was in this context that the idea to have an organisation written into the Constitution came about. Although Aboriginal people were being asked if they would like to be recognised in the Constitution the overwhelming response was that people wanted another national organisation. Somewhere the idea emerged that if it was entrenched in the Constitution, it would not be able to be abolished at the stroke of a pen.

Transcripts of these dialogues are available on the internet. The 'dialogues' culminated in the coming together of 250 Aboriginal people from across the country in 2017 at what was known as the First National Constitutional Convention and the *Uluru Statement from the Heart* was born.

It must have been an emotional moment for many of those involved as the Statement is a fine piece of prose, even better as oratory and deliberately addressed to the Australian people in the form an explanation and an invitation. However, the Prime Minister of the day simply refused to engage. The tone having been set for the country's response, we then went through a period of scurrilous misrepresentation of the statement and its intent – most of the attack led by parliamentarians on the government side.

Nevertheless, the Minister for Indigenous Affairs was allowed to proceed with a co-design process for a Voice to Parliament which potentially could be legislated. The National Indigenous Affairs Agency then led a process involving several appointed committees to consider what a Voice might look like at the local, regional and national levels. All 281 pages were published in July 2021.

Demise of ATSIC

From 1990 to 2005 we had a nationally elected Aboriginal organisation in the Aboriginal and Torres Strait Islander Commission (ATSIC). It was established at a time when there was a certain degree of goodwill towards Aboriginal people and comprised both elected and administrative arms i.e., staff of the Australian Public Service. Over the years from the 1970s governments would establish then abolish Aboriginal advisory groups. First there was the National Aboriginal Consultative Committee, then the National Aboriginal Conference, then the Aboriginal Development Commission which ran programs and then, ATSIC which was tasked with advising government and running some programs. The pattern was that after a few years these organisations gained confidence and became more critical of government – so a review would be held, the operation would be criticised, and the organisation then abolished.

In the case of ATSIC, the incoming government in 1996 was highly antagonistic from the outset. It ordered a special audit to find the mismanagement and corruption being alleged. The finances of all the organisations ATSIC funded were audited, however, there was never going to be any corruption found because the public service knew

how to manage money, write policy, and design and administer programs. And of course, it understood how government works. The grants program had always been tightly managed. ATSIC had been under scrutiny from the very beginning especially by those who were opposed to the idea that Aborigines could make good decisions about their own lives. When the audit failed to find mismanagement, the government continued its attack on the credibility of the organisation in various ways.

Just before the change of government in 1996 the then Prime Minister had asked ATSIC to advise on a social justice package following the High Court Mabo decision. ATSIC produced a major policy platform in the form of a report to government entitled *Recognition, Rights and Reform*. The report was produced under the guidance of the elected representatives and proposed wide ranging structural reforms designed to move Aboriginal and Torres Strait Islander people from being treated as welfare dependents to being active participants in the development, implementation and monitoring of policy and programs through their elected representatives. This was to be a rights-based approach and it drew on international standards being developed to ensure that the universal human rights adopted by the United Nations after the Second World War could also be enjoyed by indigenous peoples across the globe. The report, containing 113, recommendations was met with silence and inaction.

Although ATSIC was tasked with advising government on policy, there remained in the Prime Minister's department, an office of Indigenous Affairs to give more 'objective' advice to the government and to carry on the work of supporting the minister and the government. This remains today in the form of the National Indigenous Affairs Agency – which is sometimes mistaken for an organisation acting in the interests of Aboriginal people. And it will remain if a Voice is established.

By the end of the twentieth century the government had succeeded in discrediting ATSIC to such an extent that the opposition even promised to abolish it if elected. The government of the day declared the 'experiment' in self-determination a 'failure' and ATSIC was abolished in 2005. From this point onwards grant funding was removed from Aboriginal community-controlled organisations and service delivery was increasingly provided by non-Aboriginal organisations.

The Guardian newspaper recently did a 'fact check' on the campaign materials of the 'yes' and 'no' campaigns. From this we learn that as of December 2021, of all grants paid out by the National Indigenous Affairs Agency, 39% were being paid to 589 non-indigenous charities and organisations including beneficiaries going to significantly large corporations. Hence, a substantial proportion of government funding for services to Aboriginal people is going to external organisations and this has been occurring since at least the 1980s.

Fall-out from ATSIC

ATSIC is no longer mentioned, except by those declaring it corrupt. No-one dares mention the words 'national organisation' or 'representative organisation', so tainted was ATSIC's reputation. Neither is there ever a mention of self-determination or rights, indigenous or citizen's rights. Now, apparently, we just want to have a Voice, we want to have a seat at the table but not while the decisions are being made.

The now Senator Mr Patrick Dodson, who had earned a formidable reputation as a social justice campaigner, was appointed by the government to Chair the Reconciliation Council. Towards the end of his tenure, he spoke out against the government and subsequently was not appointed to another government position. Similarly, Dr Lowitja O'Donoghue AC CBE DSG, the first Chairperson of ATSIC, who had served several governments loyally, after speaking out against the Commonwealth government, was never appointed to another position. Ms Patricia Turner AM, the only ever Aboriginal Chief Executive Officer of ATSIC was also the only ATSIC CEO not to be appointed to another government position at the same level. Ms Turner had always given frank and fearless advice to government in what she considered were the best interests of the Aboriginal people.

IMPACTS ON A MARGINALISED SOCIETY

It is worth noting that a study published by the *Journal of Indigenous Issues* (Vol. 22, 3–4, pp. 1–32) in 2019, which looked at poorer outcomes amongst marginalised groups, found that three out of four Australians hold implicit bias against Aboriginal people even if it is unconscious. The study went on to talk about the effect such unconscious bias can have on the daily lives of marginalised people.

I think this is evidence that if some of the effort that goes into changing the behaviour of Aboriginal people was diverted to examining the behaviour of others, we might see a far more harmonious society. If more attention was paid to the attitudes and behaviours of those who make decisions about Aboriginal people and to changing the structures and institutions within which Aboriginal people must live, we might see the beginnings of a more equitable society.

We see even now open hostility at the suggestion that Aboriginal people might have any sort of arrangements differing from those of the majority. We are hearing Aboriginal people talk in the media about the importance of nation building and the minister giving assurances about what an advisory body will not be doing.

Aboriginal young people are taking their own lives in unprecedented numbers, Aboriginal men, women and children are being locked up at unprecedented levels, and children are being removed from their families in unprecedented numbers. In these circumstances nation-building and patriotism should not be the primary concerns of Aboriginal spokespersons.

The 'getting to know you and getting to like you campaign' run by the reconciliation advocates for 15 years has not improved the social indicators of well-being of Aboriginal people and is yet another failed campaign.

Rights of indigenous peoples

In the mid-1980s the United Nations started looking at the plight of indigenous peoples across the globe. Some countries, like New Zealand, Canada and the United States had entered treaties with indigenous people. But failure to uphold the terms and dispossession were common threads across the colonising states. Nevertheless, treaties had been negotiated between the colonisers and the tribal leaderships. They did not have committees made up of colonisers and colonised making recommendations to the colonial authorities about how they should be governed.

The issue of concern in the 1980s was that indigenous people had all been colonised and were living in countries where they would always be a small minority. They had all been dispossessed of their lands to varying degrees and their social, economic and governance structures were being eroded by the majorities that now occupied their lands and consequently their cultures, their ways of life and their very lives were at risk.

In 1985 work commenced at the United Nations to establish minimum standards for the survival, dignity and well-being of indigenous peoples across the globe. ATSIC participated actively in this important work during its lifetime. The work culminated in the United Nations Declaration on the Rights of Indigenous Peoples which was accepted by the United Nations General Assembly in 2007 with 144 countries voting in favour. Australia was one of four countries which voted against the Declaration at the time.

These standards are a recognition that indigenous peoples cannot thrive, or in some cases survive, within the institutions of the nation states within which they now live. The declaration goes into some detail about the rights of indigenous people to participate in the institutions of their nation states but also to have their own institutions and structures so that their people can live on equitable terms with the majority populations.

THE VOICE REFERENDUM

At present, the vote 'yes' campaign for the Voice referendum is insisting that we need an advisory committee to enable us to build a better nation and that somehow the lives of Aboriginal and Torres Strait Islander people will be improved by this. And *Closing the Gap* seems to be the reason we should vote 'yes'. Belief in this proposition is waning, as is becoming evident in the polls and the commentary.

The request for permission to have an advisory body to the Parliament is being pitched to the Australian people because governments have refused to listen to the very modest demands of the Aboriginal people for generations. We see in the Northern Territory, for example, governments paying attention only when Aboriginal problems spill over into the towns and then businesses are affected.

We are seeing deep seated racism emerge in the referendum campaigns. Claims that Aborigines are getting something not available to other people, racist commentators talking about how they don't like angry blacks and that we should behave in a way which doesn't offend other people. But few protested when a Prime Minister slammed the lectern at the Reconciliation Conference in Melbourne, basically demanding that the Aborigines conform, stop complaining and trying to be different.

The other issue on which government is remaining silent is the current arrangements for *Closing the Gap*. The Coalition of Peaks is a national coalition of peak Aboriginal organisations each representing their sectors such as health, childcare, legal services, languages, media and so on. Currently this coalition represents 800 Aboriginal and Torres Strait Islander community-controlled organisations across the country.

In 2020, after some years of negotiation, this coalition signed a National *Closing the Gap* Agreement with the Commonwealth and the states and territories on priority areas for reform and on partnership arrangements between government and Aboriginal community service delivery organisations. Recently, the Lead Convenor of that coalition has been travelling the country meeting with premiers and their cabinets about the implementation and monitoring arrangements of that agreement. Even with all this effort we see the Productivity Commission reporting that government decisions still often fly in the face of the reforms they have agreed to pursue.

What does voting 'yes' mean?

Parliament will decide on the powers and functions of a Voice and on how it will be constituted. There will be further rounds of consultation especially regarding the formation of local and regional voices. But from the report of the co-design committees under the previous government we can be confident that a national Voice will be drawn from local and regional groups with 'local' and 'regional' yet to be defined. It will somehow be structured upon nine lofty principles detailed in the report. There will be a gender balance legislated, there will be co-chairs, not a single chairperson, and minorities within Aboriginal and Torres Strait Islander communities will be guaranteed access to the main body in some way. 'Selection' not 'election' is currently the preferred term.

They will work in partnership with government although in a government department and in the life of a government minister there are so many competing priorities it is difficult for true partnerships to become a reality. And the minister has said the Voice won't be constrained by three-year election cycles – but governments will be.

For example, imagine what would happen if the national Voice wanted uniform laws across the country to restrict the trading of liquor outlets and gaming establishments, or if they wanted a sugar tax imposed and subsidised fresh food in remote communities. We have already seen what

has happened in Alice Springs when the NT government decided to extend liquor trading restrictions. And the Minister for Indigenous Affairs and others are already ruling out things a Voice will not be advising on.

The Report says the Voice will not duplicate the work of any existing organisation. Since the Voice is being promoted as the primary vehicle for *Closing the Gap* when there is already a *Closing the Gap* National Agreement in place it will be interesting to see how this works. Although it is not the case in Tasmania, in other states there are already a multitude of Aboriginal organisations and advisory groups with quite specific functions so it is hard to see how another body will not duplicate the role of some or add value.

What is definite is that individuals will not be eligible to be considered for appointment to the Voice until they have been declared fit and proper persons by an ethics committee. This is to ensure no unsavoury characters can give advice to the Parliament. Each local or regional group will be required to meet a set of minimum expectations which will be legislated. Each group will have a secretariat which will be provided by the government.

The Minister for Indigenous Affairs, Linda Burney, has said she will ask for fresh ideas on intractable problems with the priorities being health, education, housing, and jobs. But ever since Aboriginal people have been allowed to live in houses there has been a huge housing backlog. So, I'm not sure about the need for new ideas when the old one's haven't been implemented.

If the referendum is successful, by the time further consultation has taken place and all components of the Voice are established it will be close to ten years from the gathering at Uluru. History tells us this will be approaching the use-by-date of a national Aboriginal organisation which will now again need review!

Is this a reason to vote 'no'?

Although there are criticisms of the process that led to the Statement there was nevertheless a process. Not everyone agreed with it. Senator Patrick Dodson has recently written that he was taken aback when he heard it. But he has adjusted. Others were disappointed. But there are many who hold out hope that their lives will change for the better, that they will be listened to or that it will lead to better things in the future. Why would we not support those people? My biggest fear is that the expectations raised by the 'yes' campaign will leave many Aboriginal people disappointed and let down yet again when they see no improvement in their living situations or family protection resulting from a Voice.

A highly respected clan leader from the Northern Territory, recently deceased and publicly mourned by politicians, this year won a case in the Federal Court against the Commonwealth for a breach of the Native Title rights of his people. The Commonwealth has sought leave from the High Court to appeal the decision. This would not be a matter upon which advice from the Voice would be welcomed by the Commonwealth, but it obviously is a matter of some importance to this clan group. I mention this only because it is an example of how even powerful and respected voices are not listened to when it doesn't suit.

If the referendum fails, there will be many Aboriginal people feeling rejected by the Australian people. There will be no action from the government to give effect to the United Nations Declaration on the Rights of Indigenous Peoples. There will be no appetite from the Commonwealth to move ahead with treaty or truth-telling because the message will have been that the Australian people just don't want it. If the vote is 'no' for such a simple, harmless little thing then certainly nothing more contentious will be taken up.

The Prime Minister, the Minister and the 'yes' campaigners will be exhausted. The rest of the country will be sick of it. The international press will report that Australia said no to recognising its Indigenous people – or maybe they will just say – racism is still rife in Australia!

(accepted 3 August 2023)

NOMENCLATURE OF *SPYRIDIUM PARVIFOLIUM* AND *S. OBCORDATUM* (RHAMNACEAE: POMADERREAE) FROM SOUTHEASTERN AUSTRALIA AND TASMANIA

by Jürgen Kellermann and Catherine Clowes

(with one figure)

Kellermann, J & Clowes, C (2023). Nomenclature of *Spyridium parvifolium* and *S. obcordatum* (Rhamnaceae: Pomaderreae) from south-eastern Australia and Tasmania. *Papers and Proceedings of the Royal Society of Tasmania* 157: 19–25. State Herbarium of South Australia, Hackney Road, Adelaide, South Australia 5000, Australia, and School of Biological Sciences, The University of Adelaide, South Australia 5005, Australia (JK*); School of Biosciences, The University of Melbourne, Parkville, Victoria 3010, Australia (CC). *Author for correspondence: juergen.kellermann@sa.gov.au

The nomenclature and typifications of *Spyridium parvifolium* (Hook.) F.Muell. and *S. obcordatum* (Hook.f.) W.M.Curtis are reviewed. *Spyridium parvifolium* var. *molle* (Hook.f.) Benth., so far recognised as a separate taxon in Tasmania, is not accepted, following a recent molecular analysis of the species complex. Lectotypes are chosen for *Cryptandra obcordata* Hook.f. (basionym of *Spyridium obcordatum*) and its synonyms *Trymalium serpyllaceum* Reissek & F.Muell., as well as for *Pomaderris parvifolia* Hook. (basionym of *S. parvifolium*) and the synonyms *Cryptandra mollis* Hook.f., *Trymalium eupatorioides* Reissek & F.Muell., *Trymalium hermannioides* Reissek and *Spyridium parvifolium* var. *hirsutissimum* Benth.

Key Words: *Spyridium*, Rhamnaceae, Pomaderreae, nomenclature, typification, taxonomy, determination key, South Australia, New South Wales, Victoria, Tasmania.

INTRODUCTION

Spyridium parvifolium (Hook.) F.Muell. is one of the most well-known shrubs of Rhamnaceae in southeastern Australia. It occurs in South Australia (SA), Victoria, New South Wales (NSW) and Tasmania, with two main divides in its distribution: one across Bass Strait between Victoria and Tasmania, and the second across the Murray Darling Depression between western Victoria and south-central SA. The phylogenies of Clowes *et al.* (2023) indicated the following species as most closely related to *S. parvifolium* and grouped them into one clade: *Spyridium cinereum* N.A.Wakef. (from the Grampians and East Gippsland, on both sides of the Victoria/NSW border), *S. daltonii* (F.Muell.) Kellermann (Grampians, Victoria) and *S. obcordatum* (Hook.f.) W.M.Curtis (northern Tasmania). Compared to *S. parvifolium*, these three species have very restricted distributions.

Plants of *S. parvifolium* range from being prostrate to medium-sized shrubs (to 2 m high) with elliptic to obovate or orbicular leaves that have a conspicuous secondary venation ± impressed on the upper surface. The leaves are usually hispid to more densely pubescent on the upper surface, sometimes even covered with an indumentum of dense stellate hairs, or rarely glabrous. Flowers of the species are clustered in loose heads, which are surrounded by c. 2–5 densely white-felty floral leaves, covered in stellate hairs on the upper surface.

As the species is very variable morphologically, particularly in size and indumentum of the leaves, several formal varieties were used by Bentham (1863): *Spyridium parvifolium* var. *molle* (Hook.f.) Benth. (based on *Cryptandra mollis* Hook.f.) with densely grey-green stellate-pubescent stem leaves, occurring on Flinders Island and Cape Barren Island, off the north coast of Tasmania, though some specimens with softly hairy leaves from Wilsons Promontory, Victoria, and Tasmania have also been identified as this variety (e.g., Douglas 2014); *S. parvifolium* var. *grande* F.Muell. ex Benth. (based on *Trymalium eupatorioides* F.Muell.) with very large leaves from the Dandenong Ranges, Victoria; *S. parvifolium* var. *hirsutissimum* Benth. with long-hispid hairs on stems and leaves from the Grampians Ranges, Victoria. The typical variety accommodated all other entities of this variable taxon and occurred across southeastern Australia and Tasmania. However, in recent years, only var. *molle* was accepted as a separate taxon in Tasmania (Curtis & Morris 1975), all other states only recognised the variable *S. parvifolium*, but Walsh and Udovicic (1999, p. 117) stated that 'a number of forms [...] may warrant formal recognition'.

In addition, small-leaved specimens were published as *S. brevifolium* Reissek from Victoria and as *S. hermannioides* Reissek from SA, but these names never seem to have been used. Several informal variants of the species, labelled as 'Brisbane Ranges form', 'Rocky sites form' and 'Prostrate form' (Clowes *et al.* 2023; see also Walsh & Udovicic 1999) have been recognised in herbarium collections.

Spyridium parvifolium var. *molle* was described from Flinders Island and defined as having '[L]eaves about half an inch long, when young equally covered with greyish down [i.e., covered on both leaf surfaces with greyish hairs]' (Hooker 1834, p. 257, as *Cryptandra mollis*). However, over the years botanists seem to have been uncertain as to the validity of the taxon, as plants with an upper leaf surface that is densely stellate-pubescent occur randomly throughout the range of the species, not only on Flinders

Island. For example, in all mainland floras and handbooks seen, var. *molle* was included in *S. parvifolium* or not mentioned at all (Costermans 1981, Canning & Jessop 1986, Walsh & Udovicic 1999, Harden 2000, Mayfield 2013). Coates (1996, p. 21) stated that it 'is a doubtful taxon'. On one herbarium specimen, the collectors H. and A. Wapstra noted that when visiting Flinders Island they 'looked at a number of places where var. *molle* was meant to occur' and 'were unable to see a clear distinction', so that they 'came to the conclusion that possibly the distinction is ambiguous' (HO 523002: label). A recent molecular analysis of the *S. parvifolium* complex (Clowes *et al.* 2023) showed that all published varieties and informal variants do not warrant formal recognition and that *S. parvifolium* is a single, morphologically variable taxon.

Spyridium cinereum and *S. obcordatum* are both prostrate to decumbent shrubs (5–20 cm high) with small leaves, which are tridentate or have apical teeth. The upper leaf surface of *S. cinereum* is densely stellate-pubescent, whereas in *S. obcordatum* it is glabrous and glossy; inflorescences and flowers of *S. obcordatum* are also slightly larger. This close relationship of the two species had already been observed by Wakefield (1957).

Plants of *Spyridium daltonii* are tall shrubs (to 3 m) and can be distinguished from the other species by their linear to narrowly elliptic leaves, which end in a sharp point; these leaves are closely revolute so the lower surface is not visible. It is also the only species discussed here that does not have densely stellate-felty floral leaves surrounding the inflorescence.

In this paper we review the nomenclature of *S. obcordatum* and *S. parvifolium*, and formally include *S. parvifolium* var. *molle* into the latter species. In preparation of a *Flora of Australia* treatment of the family (Kellermann *et al.* 2022b), their synonymies are clarified and lectotypes are chosen, where necessary. The typifications of *S. daltonii* and the hybrid *Spyridium* ×*ramosissimum* (Audas) Kellermann (= *S. daltonii* × *S. parvifolium*) were reviewed in Kellermann (2005). The nomenclature of *S. cinereum* does not need to be re-assessed as proper holo- and isotypes were designated by Wakefield (1957). An identification key, stating the main differences between these taxa, is also provided.

MATERIALS AND METHODS

Dried herbarium specimens were examined according to standard procedures. Flowers were rehydrated in hot water with a drop of detergent. Specimens from the following herbaria were studied: AD, BM, CANB, HO, K, MEL, MELU and NSW. Type specimens from other herbaria were examined online via JSTOR Global Plants (https://plants.jstor.org): E, L, LD, M, NY, P and US. In addition, fieldwork was undertaken in SA, NSW, Victoria and Tasmania, to observe plants *in vivo* and collect new material. In '*Selected specimens examined*' all duplicates are listed, but only those from Australian institutions were seen.

Lectotypes were chosen according to the *International Code of Nomenclature* (Turland *et al.* 2018) and following the recommendations of McNeill (2014) and Mosyakin *et al.* (2019).

TAXONOMY

1. Spyridium obcordatum (Hook.f.) W.M.Curtis, *Victorian Naturalist* 87: 251 (1970)

Cryptandra obcordata Hook.f., *Fl. Tasman.* 1: 71 (1855)

Type citation: '*Gunn*, 1249', 'Trap hills on the banks of the Tamar; also abundant on the Asbestos Hills, *Gunn.*—(Fl. Oct.)'. – *Lectotype (here designated)*: Asbestos Hills, 26 Oct. 1843, *R.C.Gunn 1249* (K 000618721, ex Herb. Hooker). – *Isolectotypes*: K 000618722, ex Herb. Hooker; NSW 654886, *n.v.* – *Residual syntypes:* Asbestos Hills, 11 Jan. 1843, *R.C.Gunn 1249* (AD 97729200; BM 000050764; HO 21356; K 000618720, ex Herb. Hooker); West Head, Tamar [River], 21 Oct. 1844, *R.C.Gunn 1249* (HO 537265; HO 537266; NSW 515492, *n.v.*; NSW 607395, *n.v.*); Tasmania, 21 Oct. 1844, *R.C.Gunn 1249* (NSW 515492, *n.v.*); Tasmania, *s.dat.*, *R.C.Gunn 1249* (BM 000050745, left branch, ex Herb. H.F. Hance). – *Possible residual syntypes*: Tasmania, *R.C.Gunn s.n.* (E 00768736; L.2327572; M 0211889; NY 00298274; NY 00298275; P 06764821; P 06766710, left specimen; P 06766713; US 17225; US 17226).

Typification: The collector Ronald Campbell Gunn did not use collecting numbers, as they are used today, but species numbers (George 2009), hence there are collections from different dates available in several herbaria for *Gunn 1249*, the collection number listed in the protologue. As lectotype, we chose the larger specimen at K, from Hooker's own herbarium, which was collected in October, the month indicated by Hooker after the location description.

Many specimens of *S. obcordatum* collected by Gunn are available in herbaria worldwide, but most of them are not labelled with a collecting number, location or date; they are all possible syntypes.

Trymalium serpyllaceum Reissek & F.Muell., *Linnaea* 29: 280 (1858). – *Spyridium serpyllaceum* (Reissek & F.Muell.) F.Muell., *Fragm.* 3: 80 (1862), *nom. illeg. & superfl.* – *Spyridium serpillaceum* F.Muell., *Monthly Notices Pap. & Proc. Roy. Soc. Tasmania* 1874: 80 (1975), *orth. var.*

Type citation: 'Van Diemensland (C. Stuart).' – *Lectotype (here designated)*: Tasmania, *C.Stuart s.n.* (MEL 0585308, labelled by Mueller & Bentham). – *Residual syntypes: N[ea]r* York Town, Nov. 1850, [*C.Stuart s.n.*] (MEL 0585306); N[ea]r Port Sorell, SW Coast, Novr, [*C.Stuart*]. *P32* (MEL 0585305); Plantae Muellerianae, Van Diemensland, *C. Stuart s.n.* (LD 1010558); Van Diemensland, *C.Stuart s.n.* (MEL 0585310). – *Excluded specimen*: Van Diemensland, *C.Stuart s.n.* (MEL 2105114, ex Herb. Sonder, labelled by Mueller as *T. serpyllaceum*, but the specimen is *Pomaderris racemosa* Hook.).

Typification: Reissek & Mueller (in Reissek 1858) described *Trymalium serpyllaceum* from specimens collected

by Charles Stuart in Tasmania. Some of these were distributed with the printed label 'Plantae Muellerianae./ Van Diemensland./leg. C. Stuart.', presumably by Mueller, other specimens at MEL have labels stating the actual collecting localities (a similar case is the type of *S. prostratum* Reissek, a synonym of *S. eriocephalum* Fenzl; Kellermann *et al.* 2022a). As lectotype, a specimen is chosen above, which was annotated by Mueller and has a label with the name of the collector.

Common names: Creeping spyridium (Anon. 2007), creeping dustymiller (Wapstra *et al.* 2010).

Distribution and habitat: The species is endemic to Tasmania and occurs in a small area in the northern part of the island. It grows in open habitats and is frequently found on outcropping rocks or exposed rock sheets. In inland regions, *S. obcordatum* grows in forests and woodlands, often among serpentine rocks, in coastal areas it occurs in coastal heath and woodlands.

Notes: This prostrate species is most similar to the Victorian *S. cinereum*, but that species can be easily recognised by its densely felty leaves, which are broader at the apex [leaf width 2.5–4.3 (–5.4) mm vs 1.7–3.5 (–5) mm in *S. obcordatum*]. The flowers of *S. obcordatum* are also larger [hypanthium diameter 1.3–1.5 mm, sepals c. 1.2 mm long] than in *S. cinereum* [hypanthium diameter 0.7–0.9 mm, sepals c. 0.8 (–1) mm long].

Conservation status: The species is listed as 'Vulnerable' in Tasmania and in Australia (TSS 2011; see also Coates 1991, Coates *et al.* 1999). It is conserved in Narawntapu National Park (formerly called Asbestos Range National Park) (N.P.).

Specimens examined: **TASMANIA:** *Midlands*: Tasmania, *s.dat.*, *Anon.* (HO 123758 ×2, ex MEL); Hillside, 600 m SW of Kelso Rd bridge, crossing Kelso Bay just S of Kelso on Tamar River (R.), 1 Nov. 2004, *R.Barnes s.n.* (HO); Dazzler Ra., 5 July 1983, *S.J.Berrigan s.n.* (HO); Greens Beach, corner of Pars Rd and Ocean View Dve, rd reserve (res.), 29 Oct. 2015, *C.Clowes 239* (AD, MELU); Port Sorrel, Summerhill Rd, N side, opposite property no. 134, 2 Nov. 2015, *C.Clowes 284* (AD, MELU); 1.5 km W of Hawley Beach, 8 Sep. 1990, *P.Collier 4713* (HO); Barnes Hill, serpentinite flat, 31 Nov. 1989, *F.Duncan s.n.* (HO ×2); Dans Hill, c. 2 km W of Beaconsfield, 15 Sep. 1979, *S.J.Jarman 12* (AD, BAA, CHR, HO, MEL, PERTH, WELT); Asbestos Ra., 15 Sep. 1979, *G.Kantvilas s.n.* (HO); NE of Summerhill Dve, off Port Sorell Rd, 10 Oct 2005, *A.Povey s.n.* (HO); Mt Vulcan Forest Res., 18 May 1987, *K.J.Williams s.n.* (HO).

2. *Spyridium parvifolium* (Hook.) F.Muell., *Fragm.* 3(20): 79 (1862)

Pomaderris parvifolia Hook., *J. Bot. (Hooker)* 1: 257 (1834). – *Cryptandra parvifolia* (Hook.) Hook.f., *Fl. Tasman.* 1: 73 (1855). – *Trymalium parvifolium* (Hook.) F.Muell. ex Reissek, *Linnaea* 29: 275 (1858). – *Cryptandra hookeri* F.Muell., *Syst. Cens. Austral. Pl.* 61 (1882), *nom. illeg. & superfl.*

Type citation: '*Mr. Lawrence*, (*n.* 95, 1831.)'. – *Lectotype (here designated)*: Van D[ie]m[en]'s Land, 1831, *Mr* [*R.W.*] *Lawrence s.n.* (K 000618751, ex Herb. Hooker).

Typification: Only one specimen is known of the type collection that is mentioned in the protologue. It is preserved in Hooker's herbarium at K and is here designated as the lectotype, in case a duplicate is present somewhere else. If that specimen is indeed the only one in existence, then this could be regarded as the holotype (McNeill 2014).

Trymalium majoranifolium auct. non Fenzl: Lindl. in Mitchell, *Three Exped. Australia* 2: 150 (1838), as '*majoranaefolium*'.

Trymalium brevifolium Reissek, *Pl. Preiss.* 2: 281 (1848). – *Trymalium majoranaefolium* [Lindl. ex] Reissek, *Pl. Preiss.* 2: 281 (1848), *nom. inval. pro syn.*

Type citation: 'In interioribus austro-occidentalibus (Major Mitchell's Expedition 1836)', 'in Herb. Mus. Vindob.' – *Holotype*: W, *n.v.* – *Isotypes*: Interior of New Holland, [S of the River Murray,] 25 June 1836, *Major Mitchell's Expedition 197* (CGE, ex Herb. Lindley); Interior of New Holland, *Major Mitchell's Expedition* (P 06766719, donated by Lindley in 1838).

Typification: When describing *Trymalium brevifolium*, Reissek (1848) referred to a specimen collected during the Michell expedition in Victoria and identified by Lindley as the W.A. species *T. majoranifolium* [now *Spyridium majoranifolium* (Fenzl) Rye] (Mitchell 1838). These specimens are clearly *S. parvifolium*. Two collections could be traced (CGE, P) and a third specimen in W was mentioned in the protologue ('in Herb. Mus. Vindob.'). As Reissek explicitly stated in which herbarium the single specimen he mentioned in the protologue is found (W), we accept this as the holotype of the name (see McNeill 2014, Mosyakin *et al.* 2019).

Cryptandra mollis Hook.f., *Fl. Tasman.* 1: 73 (1855). – *Spyridium parvifolium* var. *molle* (Hook.f.) Benth., *Fl. Austral.* 1: 428 (1963)

Type citation: '*Gunn*, 1949', 'Flinders' Island and Cape Barren Island, in Bass' Straits, *Gunn.*—(Fl. Oct.)'. – *Lectotype (here designated)*: Flinders Island, 22 Oct. 1844, *R.C. Gunn 1949* (K 000618732). – *Isolectotype*: NSW 592493.

Typification: Hooker (1855) clearly indicated the collection he used for describing *Cryptandra mollis*. One specimen of *Gunn 1949* from Flinders Island is available in Hooker's herbarium at K and this is designated as the lectotype, above. A duplicate of the collection is present in NSW. All specimens display the characteristic dense stellate indumentum on the upper leaf surface.

There are specimens from Cape Barren Island, the other location indicated in the protologue, collected by John Milligan in Oct. 1844. It is very likely that these were also available to Hooker, when describing the taxon; however, they are not listed in the protologue and are not type material (*J.Milligan 590* – 2 Oct. 1844: HO 57435, ex BM. – 22 Oct. 1844: HO 57431, ex BM; HO 21402. – *s.dat.*: MEL 2104638; HO 57432, ex BM).

Trymalium eupatorioides Reissek & F.Muell. in Reissek, *Linnea* 29: 270 (1858). – *Spyridium parvifolium* var. *grande* F.Muell. ex Benth., *Fl. Austral.* 1: 428 (1863)

Type citation: 'Dandenony [*sic!*] (Dr. F.Müller)'. – *Lectotype (here designated)*: Dandenong, *F.Mueller s.n.* (MEL 2120310, labelled by Mueller, Reissek and Bentham). – *Isolectotypes*: Dandenong, *F.Mueller s.n.* (MEL 2120311); Dandenong, Jan. 1853, *F.Mueller s.n.* (MEL 2120312); Australiae felicis, Dandenong, *F.Mueller s.n.* (MEL 2120313); Dandenong, *F.Mueller s.n.* (MEL 2120314). – *Possible isolectotype*: Victoria, Dandenong, *F.Mueller s.n.* (K 000618733).

Typification: Several type collections are available in MEL, including one that is annotated by both Reissek and Mueller, as well as by Bentham (with the manuscript name '*Spyridium eupatorioides*'). This specimen is selected as the lectotype, above. All MEL specimens have large leaves and are very similar in leaf indumentum and colour, and most likely represent the same gathering. A specimen at K with the same collecting details has leaves that are much greener on the upper surface; this is only accepted as a possible isolectotype.

Trymalium hermannioides Reissek, *Linnaea* 29: 275 (1858)

Type citation: 'Austral. merid. (Dr. F. Müller).' – *Lectotype (here designated)*: Austral. meridian. [*sic!*], Kaiserstuhl, *F.Müller s.n.* (MEL 2104288, labelled by Reissek). – *Residual syntypes*: Lofty Ranges, Sep. 1850, *F.Mueller s.n.* (P 06766724, accessioned 1852); Lofty Ranges, *F.Mueller s.n.* (P 06766727, ex Herb. Drake); Plantae Muellerianae, Nov. Holland. meridional, *s.coll.* (P 06888009, ex Herb. Lenormand & Herb. Caen).

Typification: One specimen was available at MEL, labelled with the name *Trymalium hermannioides* in Reissek's hand. It has very small leaves with deeply indented veins on the upper surface, typical for specimens from Kaiserstuhl and the Southern Flinders region. This is designated above as the lectotype of the name. It is very likely that a duplicate exists at W, where Reissek worked. The taxon was possibly named after Hans Hermann Behr, German anthropologist, botanist and entomologist, who collected in SA in 1844–1845 and 1848–1849 (George 2009).

Spyridium parvifolium var. *hirsutissimum* Benth., *Fl. Austral.* 1: 428 (1863)

Type citation: 'In the Grampians, *Wilhelmi*'. – *Lectotype (here designated)*: Grampians, [*J.F.C.*] *Wilhelmi s.n.* (K 000618734, ex Herb. Hooker). – *Isolectotype*: Victoria Ranges, [Grampians,] Jan. 1857, *J.F.C. Wilhelmi s.n.* (MEL 2104415).

Typification: One specimen of Carl Wilhelmi's collection is available at K and this was selected as lectotype, above. It was examined by Bentham during his work on *Flora Australiensis* (Bentham 1863) and cited by him in the protologue. The K specimen looks very similar to the duplicate at MEL and we assume they are from the same gathering.

Common names: Dusty miller (FNCV 1923, Costermans 1981, Canning & Jessop 1986, Walsh & Udovicic 1999), coast dustymiller (Wapstra *et al.* 2010).

Distribution & habitat: *Spyridium parvifolium* occurs in dry sclerophyll forests and more moist habitats in the southern Flinders Ranges, Mt Lofty Ranges and southeastern South Australia, along the coast, the Grampians and much of the high country in Victoria, and into the alpine region of NSW; in Tasmania it is mainly found on Flinders Island and a few areas along the northern coast.

Note: Following the molecular results of Clowes *et al.* (2023), *S. parvifolium* is now recognised as a widespread and very variable species, ranging from prostrate forms to upright shrubs. The leaf shape varies (fig. 1) from narrowly to broadly ovate to obovate, or elliptic to orbicular; leaf length and width range from 4–45 mm and 3–23 mm, respectively. The upper surface of the stem leaves of the taxon can be glabrous (often with a few hairs along the midrib and veins), have an indumentum of simple hispid hairs or be covered with a moderately to dense felty-stellate indumentum. These stellate hairy leaves occur sporadically throughout the range of distribution; in some areas they are the predominant form of the species (e.g., on Tasmanian offshore islands; marked with an asterisk, below). Usually, the leaf veins are ± deeply impressed.

Potential hybrids have been recorded of *S. parvifolium* and several other species of *Spyridium*, e.g., with *S. daltonii* (named as *S.* ×*ramosissimum*; Kellermann 2005), *S. vexilliferum* (Hook.) Reissek. (Clowes *et al.* 2023), *S. coactilifolium* Reissek, *S. daphnoides* (Reissek) Kellermann and *S. stenophyllum* (Reissek) Kellermann & W.R.Barker (unpubl. data).

Conservation status: The species is widespread and not conservation listed on mainland Australia. However, in Tasmania, both the typical variety and the formerly recognised var. *molle* have been listed as 'Rare' (TSU 2003a, 2003b, Anon. 2014). The status of the taxon in Tasmania needs to be re-assessed following the merger of the two varieties.

Selected specimens examined (over 650 seen): **SOUTH AUSTRALIA:** *Flinders Ranges*: Mt Remarkable, July 1960, *H.M.Cooper s.n.* (AD); Mt Remarkable N.P., Hidden Gorge Hiking Track (Tk), clockwise, c. 6 km from Mambray Creek (Ck) car park , 29 Sep. 2021, *J.Kellermann 1027 & L.Williams* (AD)*; Mambray Ck, c. 40 km SSE of Pt Augusta, 7 Aug. 1974, *D.J.E.Whibley 4322* (AD, AK, HBG)*. *Murray*: Kaiserstuhl Conservation Park (C.P.) c. 500 m along the Stringybark Tk, on both sides of the tk, enter via Gate 1, 6 Nov. 2015, *C.Clowes 323 & T.Schuster* (AD, MEL, MELU); Chaunceys Line near Ferris-MacDonald, 14 Aug. 1985, *B.M.Grivell 112* (AD); 6 km WNW of Springton, 9 Sep. 1981, *J.Z.Weber 6781* (AD, NT, ODU, OSA). *Northern Lofty*: Telowie Gorge C.P., 24 Nov. 1999, *P.D.Canty BS104-3287* (AD); c. 1 km S of 'Webb Gap' in the Tothill Ra., 29 Nov. 2006, *D.J.Duval 699* (AD)*; Spring Gully C.P., S of Clare, Cascade Walking Tk, about half way to cascades, 9. July 2020, *J.Kellermann 986* (AD, B, CANB, MELU, NY)*; Telowie Gorge N.P., top of ridge, N of gorge, 3 Oct. 1995, *F.Udovicic 263* (AD, CANB, E, MEL, PERTH, SI)*. *Southern Lofty*: Hill overlooking Cape Jervis, 6 Oct. 1992, *R.Bates 29150* (AD, CANB, GZU, MEL, PTBG, UTEP); Black Swamp, Cleland's Gully, c. 20 km SSW of Strathalbyn, 26 Jan. 1926, *J.B.Cleland s.n.* (AD)*; Humbug

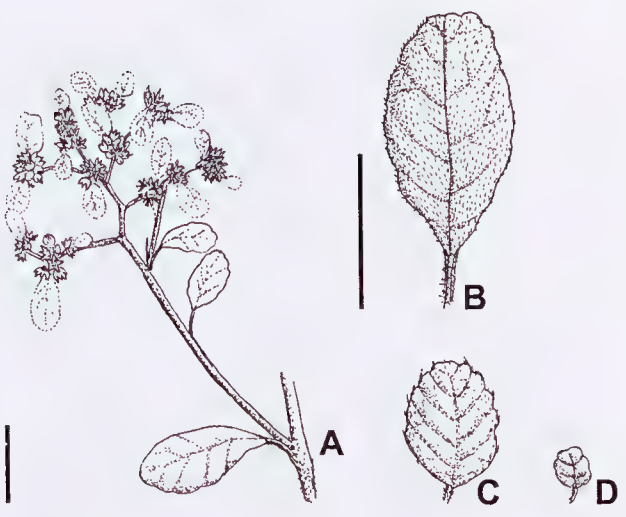

FIG. 1 — *Spyridium parvifolium*. **A** Flowering branch, typical form, the flower-heads surrounded by white felty floral leaves (*M.G.Corrick 9945*); **B** Leaf ×2, typical form (*M.G.Corrick 9945*); **C** Leaf, Grampians form, i.e. var. *hirsutissimum* (*A.C.Beauglehole 17861*); **D** Leaf, 'Brisbane Ranges form' (*T.B.Muir 1212*). — Scale bars = 1 cm. Illustration by P.G. Neish, first published in Walsh & Udovicic (1999). All vouchers at MEL.

Scrub (near Williamstown), c. 1.5 km W of Wild Life Sanctuary, at W border of scrub, 21 Aug. 1960, *H.Eichler 17027* (AD, AK, BISH, BRI, CANB, CHR, COLO, CAI, CAL); Longwood, Aug. 1938, *E.H.Ising s.n.* (AD)*; Shapes Gully, c. 6 km E of Adelaide, 6 Jan. 1959, *E.N.S.Jackson 2* (AD, NE, P, TI); Scott Ck C.P., downhill, c. 20 m from tk inside fence, opposite side tk to property no. 1, 21 July 2016, *J.Kellermann 613* (AD, MELU, NSW)*; Piggot Range Rd, just W of Gate 12 at border of Onkaparinga N.P., between rd and N.P. fence, 21 Sep. 2016, *J.Kellermann 618* (AD, MELU, SI); Horsnell Gully C.P., walking tk to waterfall, about half way, 4 Sep 2021, *J.Kellermann 1018* (AD, B, E, GH, HBG, K, KUN, US); Hundred (Hd) of Nangkita, Sect. 347, 25 Nov. 1999, *D.E.Symon & D.M.Armstrong BS117-457* (AD)*. *South Eastern*: On Easter Rd by outcrop of granite, 15 km direct SSW of Granite Rocks, Hd of Marcollat, Sect. 62, 13 Sep. 1991, *P.D.Canty & L.M.B.Heard BS29-6493* (AD); Caroline Forest Res., Hd of Caroline, Sect. 372, 1 Sep. 1984, *C.Dickson 149* (AD). **NEW SOUTH WALES:** *South Coast*: 20 m E of tk to Little Ck beach camping area, Nadgee Nature Res., 21 Sep. 2011, *J.Whyte 62, M.Viler & G.Errington* (NSW). *South Western Slopes*: Brungle Gap, Wee Jasper, Tumut Rd, 21 km N of Tumut, 29 Apr. 2006, *J.S.Benson 2362* (NSW); Basin Ck, 9 km NW of Talmalmo in Dora Dora State Forest, 18 Apr. 1988, *R.G.Coveney 12927, W.Bishop & J.M.Dalby* (BRI, CBG, K, MEL, NSW)*; Minjary N.P., 1.5 km SSW of Minjary Mtn, 6 Nov. 2001, *I.Crawford 6700* (CANB, NSW)*; near Pine Gully Nature Trail, NW side of waterfall, Warby-Ovens N.P., 14 July 2011, *J.R.Hosking 3509* (AD, CANB, MEL, NE, NSW, TARCH). *Southern Tablelands*: Swamp Ck, A.C.T., 27 Feb. 1974, *I.Olsen 1940* (NSW)*; Tooma Rd, c. 7.8 km N of Alpine Way intersection, Kosciuszko N.P., 19 May 2016, *G.P.Phillips 106 & R.L.Jones* (CANB, NSW); Ravine, 7 miles NW of Kiandra, 10 miles NNW of the Cabramurra-Kiandra Rd, 13 Dec. 1969, *A.Rodd & R.Coveney 2701* (NSW). **VICTORIA:** *Furneaux*: Norman Point, Wilsons Prom., *s.dat.*, *G.J.Cross s.n.* (MEL, MELU)*; Wilsons Prom. N.P., Mt Oberon tk, 300 m from carpark, 28 July 1996, *K.Macfarlane 89* (AD, MEL, NSW); c. 1 km E of Telegraph Saddle beside Sealers Cove walking tk, 26 Oct. 2014, *N.G.Walsh 8210* (MEL)*. *Midlands*: Grampians, Mts Zero-Stapylton area, near quarry, 5 Nov. 1967, *A.C.Beauglehole 17861* (BRI, MEL, NSW); Grampians, W side of Victoria Ra., Goat Tk, 0.5 miles E of junction of Goat Tk & Harrops Tk, 17 Jan. 1969, *A.C.Beauglehole 30292* (AD, CANB, MEL, NSW); c. 10 km N of Halls Gap towards Roses Gap, 26 Oct. 1969, *J.Carrick 2528* (AD, B, KW, MELU); Grampians N.P., Victoria Valley Rd, 1 km W of Mirranatwa Gap, 8 Oct. 2019, *J.Kellermann 965 & F.J.Nge* (AD, KUN, MELU); Brisbane Ra. N.P., edge of Macleans Hwy near Switch Rd junction, 10 Aug. 1986, *D.B.Foreman 1557* (AD, BRI, CANB, MEL, NSW). *Naracorte Coastal Plain*: Close to tributary of Little Moleside Ck, c. 4.8 km NW of Piccaninny Mt, 15 Oct. 1967, *R.V.Smith 67/126* (AD, BRI, CANB, HO, MEL, PERTH)*. *South East Coastal Plain*: Otway Ra., 4 km SW of Carlisle R., 13 Aug. 1986, *P.F.Barnett 151* (MEL); Cape Liptrap Coastal Park, at Cape Liptrap lighthouse carpark, 2 Oct. 2016, *R.Dabal 11* (AD, MELU). *South East Corner*: Museum Spur Tk, W of Snowy R., 11 Mar. 1971, *A.C.Beauglehole 37357* (CANB, MEL, NSW)*; 3.3 km along Mueller Jeep Tk from Cape Everard Rd, ± km SSE of Cann R., 28 Nov. 1983, *D.Parkes EG19b* (MEL)*; Croajingalong N.P., Karbeethong Rd, 5 km NW of Mallacoota on Mallacoota-Genoa Rd, 21 Oct. 1991, *J.H.Ross 3512* (BRI, CANB, HO, MEL, NSW, S); Genoa [R.] Gorge, *s.dat.*, *N.A.Wakefield 3786* (MEL); Snowy R., W bank, c. 600 m upstream of Boundary Ck confluence, 25 Nov. 1990, *N.G.Walsh 3022, D.E.Albrecht & J.Westaway* (CBG, MEL)*. *South Eastern Highlands*: Mt Samaria State Park, 10 Sep. 1987, *A.C.Beauglehole 88401* (MEL)*; Emerald Monbulk Rd, quarry, just off tk starting c. 20 m up the quarry entrance driveway, 25 Oct. 2014, *C.Clowes 16* (AD, MELU); Dandenong Ra. N.P., off Mountain Hwy, between Government Rd, Tobruk Ave and Mystic Rd, S of Alamein Tk, 4 Sep. 2015, *C.Clowes 164* (AD, MEL, MELU)*; Torbet Rd, 2 km from Gilderoy Rd turnoff, c. 3 km W of Powelltown, 4 Sep. 1985, *D.B.Foreman 1033* (CBG, HO, MEL, NSW); Mt Lawson State Park, c. 1.32 km N of the Thologolong Tk and Flaggy Ck Tk, 12 Oct. 2017, *W.A.Gebert 536* (MEL, CANB); Corangamite, Otways, 10 km SW of Forrest, Benwerrin-Mt Sabine Rd, 10 Oct. 1985, *S.G.Harris 71* (CBG, MEL); Dandenong Ra. N.P. at the intersection of Mountain Hwy and Hilton Tk, 15 Jan. 2006, *J.A.Jeanes 1554 & S.A.Jeanes* (K, MEL)*; Valley Hwy, c. 1.5 miles S of Granya Gap, 3 June 1962, *J.H.Willis s.n.* (MEL). **TASMANIA:** *Midlands*: Smith and Others Rd, 1.5 km SW of Observatory Hill, 19 Sep. 1984, *W.F.Pataczek 15* (HO, MEL); Stony Rise, Parkham area, 28 Nov. 2002, *M.Wapstra s.n.* (HO). *North East*: Stumpys Bay, 9 Sep. 1983, *A.Moscal 2589* (AD, HO, MEL)**; Hardwickes

Ck, 11 Nov. 1983, *A.Moscal 3967* (HO, MEL, NLU)**; Stony Head, 26 Nov. 1983, *A.Moscal 4516* (HO, MEL); Mt Cameron East, *s.dat.*, *D.Ziegler s.n.* (HO). *North West*: Mining tk to Mt Balfour, 23 Oct. 1997, *A.C.Rozefelds 596* (HO); Banksia Grove above Wet Cave, Rocky Cape N.P., 2 Nov. 2008, *M.Wapstra 575* (HO). *Offshore islands*: Flinders Island (Is.), Five Mile [Jim] Rd, 18 Oct. 1976, *M.Allan 118* (HO); Cape Barren Is., Battery Bay, 9 Dec. 1989, *P.J.Cullen s.n.* (HO)**; Clarke Is., Mar. 1897, *L.Rodway s.n.* (HO)**; Flinders Is., Whitemark, 17 Nov. 2010, *M.Taylor s.n.* (HO)**; Flinders Is., Hines Rd, 100 m from intersection with Palana Rd, 14 Jan. 2007, *M.Visoiu 270* (HO, K, MEL)**; Cape Barren Is., c. 1.1 km at 36.5 degrees W of S of the summit of Big Hill, 10 Aug. 2006, *J.S.Whinray 12876* (AD, CANB, HO, MEL).

An asterisk (*) indicates specimens with dense stellate hairs on the upper leaf surface. Two asterisks (**) indicate specimens previously identified as *S. parvifolium* var. *molle*.

KEY TO *SPYRIDIUM PARVIFOLIUM* AND RELATED SPECIES

1. Leaves obcordate or (broadly) obovate, very small, 2–6 (–8) mm long, apex toothed, tridentate or notched ... 2
1: Leaves obovate, elliptic, orbicular or linear, 4–45 mm long, apex acute, obtuse or rarely emarginate 3
2. Upper leaf surface glabrous, green, glossy; floral leaves (surrounding the inflorescence) covered with a felty indumentum of stellate hairs; flowers 1.3–1.5 mm diameter; northern Tasmania ..... *S. obcordatum*
2: Upper leaf surface covered with a dense indumentum of stellate hairs; floral leaves not noticeably different (but also densely hairy); flowers 0.7–0.9 mm diameter; Grampians and East Gippsland, on both sides of the Victoria/NSW border ..... *S. cinereum*
3. Leaves orbicular, elliptic to obovate, usually wrinkled above and with prominently impressed lateral venation; floral leaves (surrounding the inflorescence) white-felty, differing from stem leaves (occasionally the upper surface of stem leaves covered with dense stellate hairs); apex obtuse or ± emarginate; SA, NSW, Victoria, Tasmania (incl. offshore islands) ..... *S. parvifolium*
3: Leaves linear to narrowly elliptic or oblong, veins on upper surface not particularly impressed; floral leaves usually not different from stem leaves; apex with a sharp point, acute or obtuse; Grampians, Victoria 4
4. Leaves linear to narrowly elliptic, apex ending in a sharp point; margins revolute and lower surface not visible, but midrib exposed; floral leaves not different from stem leaves ..... *S. daltonii*
4: Leaves narrowly elliptic or broader, apex acute or obtuse; margins recurved to revolute, but lower surface visible; floral leaves sometimes covered with a sparse indumentum (depending on the degree of hybridization) ..... *S. ×ramosissimum*

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NORMAN LAIRD (1915–1978): PIONEERING TASMANIAN FILMMAKER, WRITER AND NATURALIST

by Benjamin J Richardson

(with 11 plates)

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Norman Laird was a pioneering Tasmanian advocate for nature conservation through documentary filmmaking and writing in an era before environmental activism was well known, yet his achievements have since been overlooked. Through the camera and pen, Laird was a seminal influence on public discourse about Tasmanian nature in the mid-twentieth century, and, being in the vanguard of environmental thinking, he was at the forefront of the campaign to save Lake Pedder in the early 1970s. His story is particularly fascinating because Laird's long career with the Tasmanian Government Film Unit potentially conflicted him in making government-sponsored cinema that celebrated hydro-dams, forestry and other environmentally impactful activities. How Laird navigated that tension and how the Film Unit itself evolved amidst the environmental activism of the 1970s provokes wider reflections on the role of environmental documentaries in mediating social change.
Key Words: documentary films, environmental activism, Norman Laird, government filmmaking, Lake Pedder, Tasmania nature conservation, photography.

INTRODUCTION

When one thinks of Tasmania's iconic twentieth-century environmentalists who campaigned with the camera, Olegas Truchanas (1923–1972) and Peter Dombrovskis (1945–1996) readily come to mind. They fought to save Lake Pedder and the Franklin River respectively with their sublime images. Another pioneer in this vein, whose achievements have curiously faded from public consciousness, is cinematographer Norman Laird. Laird produced numerous documentary films, along with evocative writings, photographs and other creative achievements that honour the natural world. His omission from the public spotlight is perplexing. One might debate whether it is because his career was established before hydro-dams or other imposts on Tasmania's landscapes aroused much controversy. Yet, that wouldn't be an entirely satisfactory explanation given that the even earlier John Watt Beattie (1859–1930) and Frank Hurley (1885–1962) have accrued much recognition for their pioneering, nature-related camera work (Hore 2017, McGregor 2019). Another possible explanation might be that Laird's 30-year career with the Tasmanian Government Film Unit obscured his contribution given that government-sponsored films of his era typically glorified rather than questioned exploitation of natural heritage. That, too, is also unconvincing not only because of what Laird achieved on the government payroll but due to his extensive extra-curricular endeavours.

This paper not only provides the first scholarly distillation of Norman Laird's career but investigates two issues of wider significance. Firstly, it reflects on how Laird reconciled working for a government filmmaking agency whose agenda at times seemingly clashed with his values. It's a similar predicament Truchanas navigated as an employee of the behemoth Hydro-Electric Commission (HEC), and no doubt the quandary of some other Tasmanian environmentalists working in conflicted roles in the potentially cloistered communities of Australia's smallest state. Secondly, and relatedly, the paper aims to unveil the subtle activism of environmentalists before the more confrontational protest unleashed in the 1970s. Film was one means, along with nature writing and photography, for such subtle activism by Laird, and his example helps refute any assumption that prior to the 1970s conservationists were timid or taciturn. Analysis of his career thus contributes to broader literature on how environmental documentary films can shape public discourse (Duvall 2017) and an understanding of their historical antecedents in Tasmania specifically (Smaill in press).

As Laird died in 1978, and none of his relevant professional peers remain alive or are available to interview, this research has relied on detailed records at the national and state archives, along with analysis of Laird's celluloid outputs and published writings. The remainder of the paper distils Laird's life to put his career progression into broader context including his nature writing and community engagement. This helps to understand Laird's career in the Tasmanian Government Film Unit and how documentary films dealt with environmental issues, and hereafter, Laird's turn to more overt activism, associated with the Lake Pedder controversy, and the impact of this upheaval on the Film Unit. The paper concludes by acknowledging the significance of Laird's career and the Film Unit for understanding Tasmania's environmental history in the last century.

A SNAPSHOT OF NORMAN LAIRD'S LIFE

Norman Ramsay Laird was born to Thomas and Elizabeth Laird on 7 June 1915 in the Sydney harbourside suburb of Mosman, New South Wales, and completed his secondary schooling nearby at Naremburn Technical College. He became fascinated with cameras from a young age. His first job was as a student-artist at Canberra's Institute of Anatomy around the mid-1930s working under the auspices of esteemed anatomist Colin Mackenzie and photographer Harry Burrell, an opportunity which Laird affirms 'started (his) lifelong dual interest in art and natural science' (Greener & Laird 1971, inner cover; see also Freeman 2005, p. 3). By the late 1930s Laird had left Australia for a sojourn in New Zealand, where he married Alison Duff in Auckland and studied for a Bachelor of Science at the then Victoria College. They moved to Tasmania in about early 1941, where he gained work as a clerk for the HEC; but they divorced in 1947.

Like many of his generation, Laird's life was dramatically shaped by the Second World War. In April 1942 he enlisted in the Royal Australian Air Force (RAAF), and for much of the remainder of the conflict he served in the Photographic Reconnaissance Unit, at Coomalie Creek in the Northern Territory. His enlistment file suggests the RAAF recruiters didn't have much faith in Laird's potential, for his aptitude test result was judged by the examiner as 'fair only' (RAAF 1942, pl. 1). He would have impressed physically, however, at about 6 feet, 2 inches tall (1.9 m). Assisting with aerial surveillance photography for combat missions, Laird was able to advance his skills with the camera in a way that would prove invaluable for his big career break in Tasmania following his release back into civilian life in 1946. His time in the Northern Territory was also formative for bringing Laird into intimate contact with Australian wildlife he hadn't previously encountered such as frilled-neck lizards and goannas – subjects he would soon write about.

Laird's war service record at the National Archives discloses that he already had some flair with the camera before joining the RAAF, which helps explain why he was assigned to its Photographic Reconnaissance Unit. He had a stint as a photographer for Hobart's *The Mercury* newspaper, whose editor commended Laird for 'some excellent work ... particularly ... in the production of picture stories' (Davies c. 1942). Earlier, Laird also excelled as a freelance photographer for New Zealand's *Dominion* newspaper, earning praise as a 'leading Dominion expert on pictorial journalism' (Geddis c. 1942).

Following the war, with his skills enriched, Laird obtained a job in Hobart as the Photographer-in-Charge at Tasmania's Department of Lands and Surveys, which had realised during the war the benefits of having accurate maps derived from aerial photography. Laird's responsibilities extended to filmmaking in the department's film unit that he helped establish, where he became a leading producer of numerous documentary films commissioned by government bodies for agriculture, tourism, forestry and other portfolios. Some of his movies earned professional acclaim, such as *Hard to Windward* (1957) on the annual Sydney to Hobart yacht race, which scooped international awards and a medallion at the Melbourne Film Festival. Many films also showcased resource exploitation projects, such as logging forests and building dams, which will be discussed more fully later. Laird also made films on numerous miscellaneous subjects, such as one in 1949 on nursing careers, where he met his future second wife Hazel Newman who was then working at the Royal Hobart Hospital. They married in June 1950, an event of sufficient public interest to garner press coverage (*The Mercury*, 20 June 1950, p. 13).

Plate 1 – Laird's enlistment photo in the RAAF, service member number 31686, Hobart April 1942. National Archives of Australia, Item 203838599.

Laird worked for the remainder of his career as a government filmmaker except for 13 months in 1948–1949 when he joined an Australian research expedition to Macquarie Island, an adventure that fuelled his passion for nature and enriched his growing fame, such as when interviewed by a radio station on returning home (pl. 2).

LAIRD THE NATURALIST

Before further evaluating Laird's career as a public filmmaker, we should appraise his interests in nature conservation, for they illustrate how before the ebullient environmental activism of recent decades there were conservationists in Tasmania standing up for an imperilled nature. Whilst a movement for nature conservation was established from

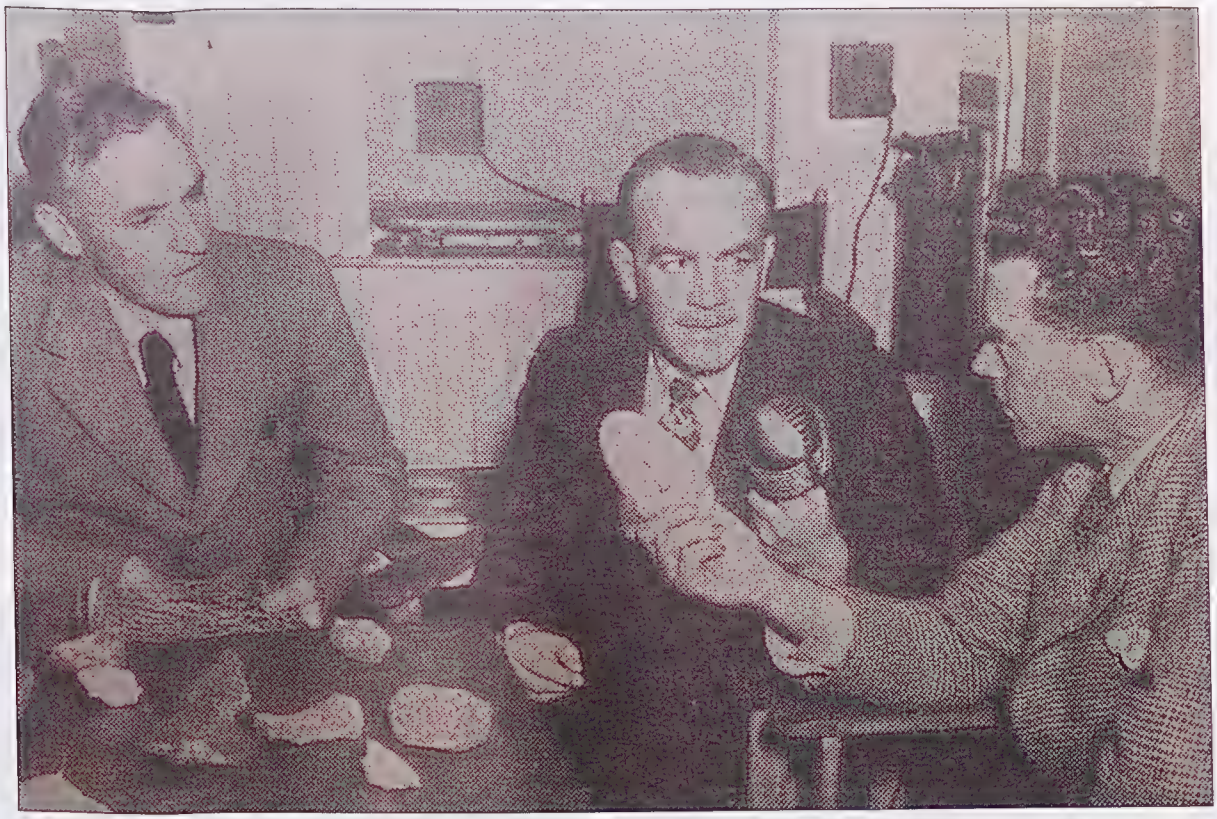

Plate 2 – Laird (right), holding a seabird egg while interviewed in Hobart by a reporter from radio station 7HO about his trip to Macquarie Island; Jack Thwaites, another environmentalist, who worked with Laird at the Film Unit, is on the left (*The Mercury*, 7 May 1949, p. 4).

at least the early twentieth century, when the state's first national parks were established in 1916, conservation gains tended to be limited to what geographer Colin Michael Hall called 'worthless lands' – places perceived to be unfit for agriculture, settlement or other 'productive' uses (Hall 1998, pp. 441–458). In Laird's era this attitude persisted.

A major turning point for Laird was when he was selected as the Tasmanian representative and official photographer for the 1948–1949 Australian National Antarctic Research Expedition (ANARE) to Macquarie Island, a 128 km^2 exposed oceanic crust populated by numerous seals and penguins, some 1,500 km southeast of Tasmania. It was an opportunity over 13 months for Laird to intimately study wildlife and with his camera record for posterity the activities of the pioneering expedition (pl. 3). The Tasmanian press reported enthusiastically on his adventure (*The Advocate*, 22 Oct. 1947, p. 2). Back home in April 1949, Laird soon gave a lecture to the Royal Society of Tasmania where he condemned the island's history of 'many privations and cruelties' against its wildlife (Royal Society of Tasmania 1949, p. 285, *The Advocate*, 8 June 1949, p. 5), and shared his valuable botanical collection with universities and London's Kew Herbarium.

Laird was also enamoured by Tasmania's landscapes and wildlife, and a leading voice for the island's bushwalking and nature conservation fraternity. He was a member of the Hobart Walking Club and the Tasmanian Field Naturalists' Club, and occasionally hiked with the renowned Jack Thwaites, who worked with Laird at the Film Unit (pl. 4). Laird sometimes represented these groups in public forums, such as the 1949 Australian Fauna Conference held in Hobart where he voiced the need to control indiscriminate use of wildlife traps that wreaked much collateral damage (Tasmania, Animals and Birds Protection Board, 1949, pp. 10–11), and appealed for game hunting to be halted until completion of scientific surveys of wildlife populations (*The Mercury*, 9 December 1949, p. 22). Laird's respect among his peers is further reflected in his appointment as the inaugural chair of Tasmania's Fauna and Flora Conservation Committee, a confederate of conservation-minded groups established in 1950 in the wake of their dismay at the excision of about 1,600 ha of the Mount Field National Park for a concession to a paper and pulp mill – Laird himself publicly spoke out against the park's annexation (*Examiner*, 7 July 1949, p. 5). The committee became a lobbyist for improved conservation governance, such as seeking greater representation of scientists on the state's Animals and Birds Protection Board (*The Mercury*, 28 February 1953, p. 6), and it (including Laird personally) was influential in rallying public opposition to defeat a proposal in 1959 to allow resumption of sealing on Macquarie Island (Guiler 1999, pp. 56–58).

Laird's environmental advocacy reached a national, and occasionally international, audience through his prolific writings in nature magazines and the press. Immediately after the war Laird began publishing in *Wild Life* and *Walkabout* – among Australia's leading nature magazines of the era – where he went beyond sharing anecdotes about curious fauna or flora to advocating their conservation. He admired not only nature's charismatic or scenic beauty but

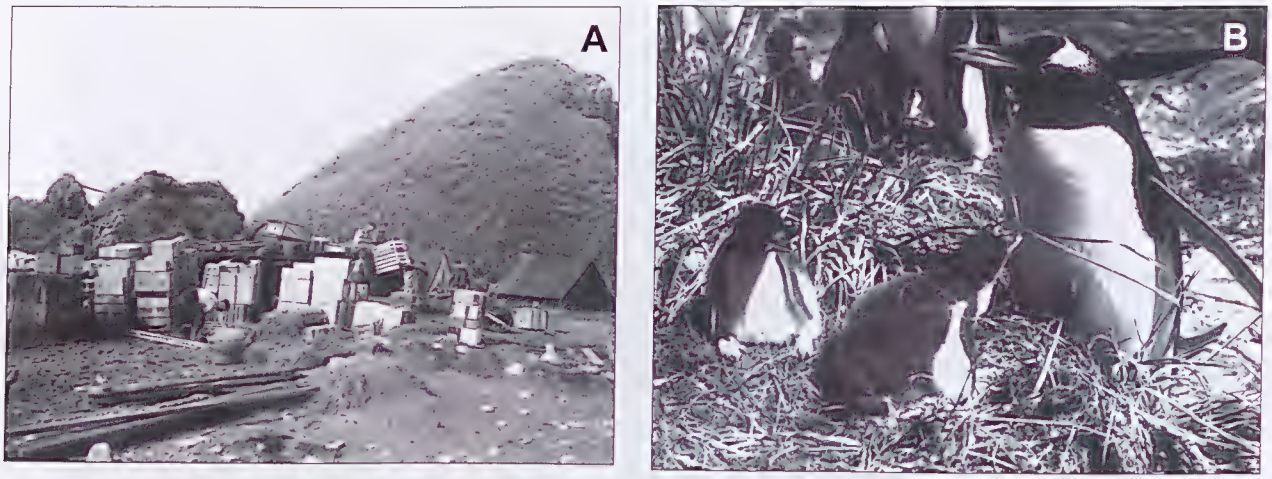

Plate 3a – **A** The Macquarie Island camp site, photograph by Laird, 1948, National Library of Australia, Item 3765887, **B** Gentoo penguins on Macquarie Island, ANARE expedition, photograph by Laird, 1948. State Archives of Tasmania, Item AA193/1/972.

Plate 4 – Laird (left), Sheila Boyle and Jack Thwaites outside the hut on the Adamsfield Track, circa mid-1940s. State Archives of Tasmania, Item NS3251/1/1122.

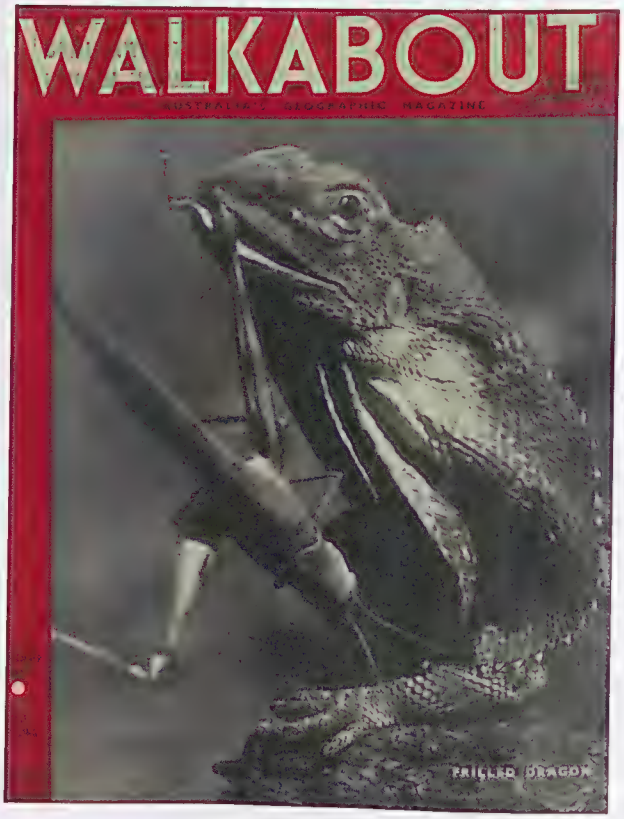

Plate 5 – Frilled-neck lizard, cover of *Walkabout* (November 1945), photo by Laird. National Library of Australia. (Nq 919.4 WAL identifier http://nla.gov.au/nla.obj-566923190)

wrote about the relatively mundane or unpopular, such as his article on Tasmanian snakes, which he encouraged bushwalkers to respect (Laird 1946a). His essays were often accompanied by exquisite photography, such as his close-up of a locust-eating, frilled-neck lizard *Chlamydosaurus kingii*, adorning the front cover of the November 1945 edition of *Walkabout* (pl. 5). Other specialist photography magazines also hosted Laird's talents, such as his lavish portfolio of images of plants and animals published in the *Australasian Photo-Review* (Laird 1952).

Complementing his photographic skills, Laird's writing abounded in poetic imagination, such as: 'Gentoo penguins glisten like painted idols in the sun. They stand in statuesque attitudes for hours at a time with only a luxurious stretch of their cardboard wings or a deft preen of their lustrous shirts to relieve the monotony of the round of winter habits' (Laird 1948, p. 10). And another about Macquarie Island: 'By morning, desolation had descended from the Plateau. Like TS Elliot's yellow fog, it rubbed its back against the sides of the cliffs, vapoured along the sea-front while in and out of its planed watchful petrels, posted skuas, and cormorants in clumsy flight' (Laird 1949, p. 7). Such evocative accounts fortified Laird's conservation message. Inspired by his wartime posting to the Top End, Laird fretted about the plight of a variety of species he had personally seen persecuted; the goanna is one. 'For at least one hundred years goannas have been meeting harsh treatment at our hands – it is time it stopped.

Plate 6 – The last known thylacine at Beaumaris Zoo, Hobart 1936; a species Laird investigated via the Thylacine Research Group. State Archives of Tasmania, Item NS4371/1/1063.

There has sprung up the fallacious belief that the reptile is venomous' (Laird 1946b, p. 7). The Tasmanian press also featured his essays and letters where he called for greater environmental protection. One missive published in *The Mercury* attacked the purveyors of marsupial furs 'in the past three decades, snaring has depleted fauna to the point of exhaustion – far exceeding their primitive and hazardous rate of reproduction' (Laird 1947, p. 3).

One of Laird's favourite extra-curricular interests was the thylacine *Thylacinus cynocephalus*, which he investigated via the Thylacine Research Group he managed. The Tasmanian State Archives contain voluminous correspondence, research papers, press clippings and photographs amassed by Laird about the famed marsupial carnivore. He personally wrote to numerous museums and zoos abroad enquiring about the existence of any thylacine specimens or other memorabilia in their collections. In response to an enquiry in 1957 from *Life* magazine in the United States, Laird estimated the market value of a new photograph of living thylacine as US$3,000 (about AUD$120,000 in 2023 money) (Tasmania, Surveyor-General and Secretary of Lands 1957). He evidently believed the thylacine survived the last confirmed specimen in Hobart's Beaumaris Zoo in 1936 (pl. 6), for in the early 1960s the London-based Fauna Preservation Society (1962, p. 207) with which he corresponded on the latest sightings, reported that Laird 'says that the thylacine undoubtedly survives in small numbers in widely separate districts but adds there is no room for optimism about the species increasing'. But it's clear he wished to see the species left unmolested, as Laird admonished those who might make it a spectacle again, caged in a zoo (Laird 1968). It's unclear from the Tasmanian Government Film Unit records whether Laird was formally involved in the short documentary *The Tasmanian Tiger* (1964) it made, but its production certainly would have immensely interested him and likely he assisted informally.

In challenging the settler-colonial perceptions of Tasmania's original landscapes and their wildlife as unruly or malevolent, Laird contributed to an emerging environmental sensitivity that reversed the focus to how humankind threatens nature rather than how nature threatens people (Haynes 2006, Stadler 2012). Whilst some of these literary and cinematic representations of nature have been rebuked for mythologising an unpeopled 'wilderness', without Aboriginal history (Smaill in press), Laird was also a pioneer here in acknowledging some of that history. His most extensive encounters with Aboriginal people were in the Northern Territory during the war, and he occasionally pointed to their environmental ethos as an example for others. Illustratively, he began an article on goannas with remarks about their place in Aboriginal art and diet, observing that 'nor are any people less wasteful of the country's wildlife than these people' (Laird 1946c, p. 7). He was attuned to the wider social injustices they endured. His 'Aborigine Girl' essay rebuked the 'national apathy' about the plight of her people, and condemned the racism they endure: 'Perhaps, when this comes about, these people whom the past has treated little better than cattle may be spared the doom commonly predicted for them' (Laird 1946c, p. 21).

A man of cosmopolitan interests, Laird also was fascinated by Tasmania's colonial architecture and history. He made at least three films about this subject – *Georgian Bothwell* (1964), *Angels and Acorns* (1965) and *Ross Bridge* (1977) – and co-authored a beautiful book on the exquisite sculptures of Ross Bridge, erected in 1836 in the town of Ross in the Tasmanian Midlands. Laird's enthusiasm for the subject is evident from his claim that 'the art of Ross Bridge is possibly the richest achievement of the earlier colonial period, if not the most significant sculptures on any edifice in the Commonwealth' (Greener & Laird 1971, p. 118). He was thus well-suited to the diverse subject portfolio of his employer's filmmaking.

A CAREER IN TASMANIA'S GOVERNMENT FILM UNIT, 1946–1977

Laird's career is inseparable from Tasmania's Government Film Unit, renamed the Department of Film Production in 1960 (hereafter both abbreviated as TGFU except where a distinction matters). He was instrumental in creating the

TGFU in 1946 and worked there throughout its history (pl. 7). Tasmania became a national exemplar of institutionalised filmmaking, being an early mover in government-run film units, and the TGFU's peak staff of around 40 made it the second largest in the nation, after the Commonwealth Film Unit (O'Donnell 2005, pp. 236–7). Laird was effectively the TGFU's foreman until 1960, after which it was managed by Lindo Taylor until 1967 and finally by Raymond Barnes until September 1977 when the TGFU closed.

The TGFU produced 'documentary films', the definition of which stirs scholarly debate given the diverse genres of such films and that they can involve creative manipulation of factual information (Nichols 1990, pp. 21–41); here, we can simply define it as a film that seeks to understand and convey real events or places using visual evidence and testimony, as well as account for the fact that the films' sponsor explicitly conceived itself as a maker of documentaries. Like its state and federal counterparts, along with that created in many countries, the TGFU flourished in an era where authorities saw documentary films as valuable means of public relations and education. As TGFU manager Lindo Taylor put it, 'The film, with its live visual and auditory impact remains one of the most effective ways of telling a story or selling a product' (Taylor 1962, p. 20). An international movement in documentary films emerged from the late 1920s, and one of its leading advocates was Scottish film producer and theorist John Grierson (1898–1972) who saw film's potential as a new kind of public communication to help with nation-building, promoting civic-mindedness and conveying the problems and concerns of ordinary citizens (Swann 1989). Making films for Britain's Empire Marketing Board and later its General Post Office, Grierson developed the model 'film infrastructure' dedicated to the production and dissemination of documentary films, a template he would later seek to export to other countries including Australia, which he visited in 1940 although government film units in Australia including Tasmania sought to develop their own agenda (Williams 2014). As government-sponsored films in this era might also be associated with the virulent propaganda of Soviet Russia or Nazi Germany (Taylor 1998), the emergence of film units in Tasmania and other liberal societies was conceptually distinguished around utilitarian and virtuous 'public relations' aiding post-war reconstruction and community education (Taylor 1959).

As film theorist Thomas Elsaesser explains, we should analyse films not just as text but as an 'event' in which 'the actual film is only one' element to consider, along with how it is made, viewed and discussed (Elsaesser 2009, p. 32). Decisions about commissioning and approving films involved the TGFU's advisory body of government representatives, although occasionally final approvals were made by the responsible Minister or even the State Premier, depending on the subject matter. Similar to the manner by which the Tasmanian Government was generally run in this era, there was little public consultation although production of some films required consulting outside bodies or experts, and private clients themselves (usually corporate) had input where they commissioned films. The

Plate 7 – Norman Laird, c. 1960, with the TGFU. State Archives of Tasmania, Item AD572/1/1.

TGFU films, however, were widely publicly circulated. The unit's 1961–1962 annual report explained: 'Since the value of a Public Relations or Tourist Promotion film lies entirely in the number of people who see it, a considerable part of the Department's efforts are now being devoted to distribution, and avenues throughout the world are being explored to this end' (Tasmania, Department of Film Production 1962, p. 3, pl. 8). Some films were submitted to prestigious international film festivals such as in Berlin and Edinburgh, as well as circulated via Australian Immigration offices and Trade Commissioner posts. Some international releases were even dubbed in foreign languages. Many films were also made available to cinemas and shown through community libraries and schools, which were especially important before the advent of television to Tasmanian households in 1960. Reflective of the high esteem in which the TGFU's work was held, occasionally its films premiered in special sessions in the Tasmanian Parliament (*The Mercury*, 23 June 1950, p. 21). By such dissemination, documentary films materially contributed to the evolving public discourse in Tasmania about how their subject matter was understood and debated.

Many TGFU films depicted forestry, mining and hydro-dams, often pitched to attract investment and immigration to Tasmania, such as the blatantly entitled 1957 film *Calling All Investors*. Some movies were also made for business clients, such as paper and pulp companies, and occasionally the TGFU even solicited for commissions, such as in 1965 when two companies were approached to sponsor a film 'on their industries to assist in export

promotion' (Tasmania, Advisory Film Board 1965). Its films were typically 10 to 20 minutes' duration, with an anonymous voice-over narration guiding the viewer through imagery (increasingly in colour from the mid-1950s) of dams, logging, mining, apple orchards, factories and other signs of an economically progressive society. Examples, some of which Laird worked on, are *Timber Makes News* (1947), *Burnie Mill* (1953), *Logging for Newsprint* (1956), *Power in the Mountain* (1956), *Industrial Journey* (1962), *Tasmania's Road West* (1970) and *Water is the Key* (1974) (State Archives of Tasmania 1946–1977).

Whilst the TGFU also filmed national parks and wildlife subjects, it did so narrowly from the standpoint of tourism rather than conveying serious scientific research, and certainly not questioning potential threats from economic development – which periodically happened, most egregiously in 1950 when 1,600 ha of the Mount Field National Park were excised to support a paper and pulp mill (Quarmby 2006, pp. 136–139). Indeed, the TGFU's managers tended to see engineered landscapes such as hydro-lakes as an aesthetic gain; its 1961–1962 film program declared 'The HEC lakes, power stations, and roads have come to constitute one of our most valuable tourist assets' (Tasmania, Department of Film Production 1961, p. 4).

The foregoing account provokes the intriguing question of how a nature conservationist reconciled himself to working on some of these films. And Laird was not the only one with this predicament. Jack Thwaites, a pioneering outdoors enthusiast and nature photographer with lengthy service on Tasmanian national parks boards, was from 1946 to 1958 the TGFU's principal administrative officer and secretary to its advisory committee (Kleinig 2008, pp. 114–116). The archival records of the TGFU provide sparse guidance to answer this conundrum but there are several possible explanations.

Firstly, prior to the Lake Pedder controversy that erupted in the late 1960s, there was a tendency among nature conservationists in Tasmania, as elsewhere in Australia, to see their cause as advanceable through discrete interventions such as expanding national parks and controlling wildlife hunting (Young 1996, Richardson 2023). The broader, systemic environmental threats from consumerism and industrialisation that became explicit leitmotifs from the 1970s previously received little acknowledgement. Some of Laird's extra-curricular writings testify to his preoccupation with the narrower, less controversial agenda. His essay on the frilled-neck lizard explained, 'it is to be emphasized that our society is still guilty of signal crimes against harmless native creatures, which could be prevented by rigorous national educational policy' (Laird 1945, p. 7). It's also clear from some of his writings, and film work, that Laird could be enamoured with the bucolic Tasmanian scenery fashioned by colonial settlers, such as his affectionate observations for the Derwent Valley in his article suggestively entitled 'This Other England' (Laird 1951b), followed up in 1958 with a film he produced, the *Valley of the Derwent*. Thus, by this explanation, Laird might not have seen films on forestry and farms as incompatible with his view of nature conservation. Relevantly, in the production guidance he wrote for the TGFU film *Tomorrow's Trees*, commissioned by the Forestry Commission, Laird explained 'the film will show the importance of forests to human civilization, the results that follow in the wake of their unplanned destruction and non-conservation' (Laird c. 1950a, p. 1). Such a sentiment, endorsing the benefits of orderly

Plate 8 – Staff of Tasmania's Department of Film Production, c. late 1960s/early 1970s. Norman Laird is at left end of middle row; State Archives of Tasmania, Item AD572/1/2.

forestry management, may have been quite plausible before industrial wood chipping came to Tasmania in the 1970s.

The foregoing explanation, however, isn't entirely convincing as some of Laird's early work showed awareness of the larger, systemic threats. In 1950 in *Wild Life* he condemned the 'commercialised, mechanised and urbanised way of life which has exploited the earth on a vast scale for two generations or more – for commercial profit' and that 'humanity … has failed to integrate the true relationship of Nature to human existence' (Laird 1950b, p. 137). More relevantly to the role of film here, Laird continued 'the chief fault may be laid at the door of those political administrations which have made no worthwhile attempts to supply society with a pattern of thought and feeling with which to approach the flood of material with which it is bombarded from so many sources' (Laird 1950b, p. 137). An essay he published the following year on the value of Tasmania's national parks describes them as sanctuaries 'far removed from the cannibalism of industry and commerce' (Laird 1951a, p. 6). It seems doubtful therefore that Laird was naïve to the bigger adversities facing the natural world.

A second reason Laird might have reconciled himself with the TGFU's agenda is that for much of its history its documentary films were likely considered by their sponsors and audiences as of a mundane, utilitarian character, serving to inform and educate the public about Tasmania's economic and social progress without any conscious ideological or political agenda. For John Grierson, the doyen of the documentary movement in the British Commonwealth, the term 'documentary' was associated with utilitarian, pedagogic and pragmatic purposes (Hardy 1947). This interpretation has some plausibility for the TGFU's filmmaking before the 1970s, before environmental issues became so politically astringent in Tasmania as to have made the TGFU's sponsors more conscious of the narrative they wished to spin. Of course, there's always an ideological undercurrent of some type to any documentary film, especially one sponsored by government, and in the case of the TGFU it was established in an era where nature was widely understood uncontroversially as an object to be tamed, rationalised and exploited. In this guise, the TGFU's films cultivated understandings of the limits, uses and values of the natural environment, and contributed to what political theorist Benedict Anderson (1991) would term an 'imagined community', which for Tasmanian society has, since its convict era, been increasingly its relationship with the island's abundant natural resources and distinct geography. It's only when that community openly fractured with the divisions over Lake Pedder, and later industrial forestry, that the TGFU's seemingly apolitical approach to documentary film became less convincing. As the TGFU's films shifted into more controversial territory, it's plausible that Laird deliberately sought to exclude himself (or was excluded by his superiors) from films celebrating hydro-dams or industrial forestry.

A third explanation might be that Laird saw his TGFU filmmaking as furnishing opportunities to deftly challenge or question the government-authorised view of nature. A major study of Canada's National Film Board in a similar era highlighted 'the agency of individual filmmakers and their willingness to produce alternate visions of the natural world' associated with non-exploitative or non-instrumental values (Clemens 2018, p. 11). Laird was involved in many films about nature conservation (though it's sometimes unclear from the film credits or archives which ones he produced or directed). Some were created for Tasmania's Scenery Preservation Board, the predecessor to the National Parks and Wildlife Service created in 1970, and as early as 1947 the Superintendent of Scenic Reserves wrote to Laird requesting a documentary film 'to make our scenic reserves better known' (Sharland 1947).

One example of such cooperation is *Mountain Sanctuary* (c. mid-1960s), a 14-minute, colour film of splendid scenery from the beach of Lake Pedder to towering old-growth forests, as well as footage of endemic wildlife. Much of the footage is at Cradle Mountain, showcasing the area for prospective bushwalkers and other visitors. Editorial guidance from Laird on its production sheds some interesting light on his expectations: 'the unspoiled land is inspiring of the unity of life upon which doubt and dogma have done much to destroy. The unity of life in a protected community or environment is of considerable importance, and an expression of the viewpoint has a place somewhere in the structure of the film, if not throughout its entire substance' (Laird c.1960, p. 1). *Mountain Sanctuary* richly conveys the beauty and grandeur of Tasmanian nature, although omits reference to any development threats. The archival record of the making of *Mountain Sanctuary*, however, hints at some tension across the different arms of the Tasmanian Government regarding priorities attached to nature conservation and exploitation (Tasmania, Department of Film Production, undated, p. 1).

Apart from dedicated nature films, several films Laird produced on seemingly unrelated subjects suggest he sought to interpolate awareness of wildlife and nature conservation into them. One example is *Georgian Bothwell* (1964), for which Laird also wrote the script. For a film devoted to the historic architecture of the town of Bothwell, it's curious to find midway through it some footage of an echidna *Tachyglossus setosus* and a blue-tongued lizard *Tiliqua nigrolutea* wandering across the landscape with the accompanying narration of the 'ancient inhabitants of the earth'.

Finally, we might look to a more mundane but important reason for Laird's career with the TGFU. It gave him long-term job security in an era where opportunities for filmmaking in Tasmania's private sector, as elsewhere in Australia, were relatively limited owing to the technological barriers and limited public money for independent filmmaking (FitzSimons *et al.* 2011, Zubrycki 2018). One independent documentary maker was United Documentary Films, which made the pro-forestry film *Timber Makes News* (1947), a subject that Laird may have not sympathised with. Another company operating in Tasmania was Island Films, making several environment-themed films from the late 1950s until the early 1980s; its *Five South West* (1959) offers a beautiful visual story of Thwaites and fellow bushwalkers hiking from Lake Pedder to the southwest

coast. Freelance filmmaking, and photography, however, would likely have been less financially rewarding and more precarious in this era, as Laird would have known from his freelance stints with the *Dominion* and *The Mercury* newspapers in the early 1940s.

FROM SUBTLE TO STRIDENT ACTIVISM: LAKE PEDDER

By the early 1970s any pretence that documentary cinema in Tasmania could be neutral, objective conveyors of public information on environmental subjects was fracturing. Film was now being conscripted to shape public opinion in an increasingly divided society. When the HEC coveted Lake Pedder, its opponents turned to film, photography and other media as campaigning tools. So too, the HEC and other government instrumentalities turned to these visual channels to bolster their social licence. Joining the acrimonious campaign to save Lake Pedder, Laird was directly mired in this seismic shift towards a more aestheticised politics, as was the TGFU itself.

The struggle over Lake Pedder began to brew in the early 1960s. The South-West Committee was formed in 1962, comprising representatives of various groups to promote conservation of the wilderness country. By 1964 the committee was liaising with the TGFU to urge it to make a film for raising awareness of the region's natural values (South-West Committee 1964a). That year it also convened a sub-committee to organise public slide shows 'to publicise the beauties of Lake Pedder and demonstrate the possible ill effects from damming of lakes' (South-West Committee 1964b, p. 2), building on a precedent established in 1956 when the Hobart Walking Club began public shows of colour slides of the scenic attractions of the south-west (pl. 9), and the earlier efforts of bushwalker and photographer Frederick Smithies who was staging similar public shows in northern Tasmania from the 1920s (Smith 1988)

When the HEC in 1967 formally announced plans to 'modify' Lake Pedder, a more activist entity to challenge it was formed — the Save Lake Pedder National Park Committee (SLPNP). It, too, sought the TGFU's assistance 'to enable us to continue with our public lectures on the South-West' (Sims 1967). Unfortunately for the committee, the following year the TGFU released a film, *Look on the Wild Side*, which lauded the economic benefits of hydro-power in supporting Tasmania's industries and the film closes with aerial footage of Lake Pedder itself with voice-over commentary of 'an area of unique scenic beauty with great hydro-electric potential'.

Laird's involvement came into the public spotlight when he joined the United Tasmania Group (UTG), the world's first green values party, and a forerunner to the Tasmanian/Australian Greens (Manning 2019). On 23 March 1972, the UTG was inaugurated at a meeting at Hobart Town Hall (pl. 10), with is chief goal being to save Lake Pedder from its watery grave when the two dominant political parties shared a similar commitment to resource exploitation

Plate 9 – Auster Aircraft of Southern Tasmania Aero Club on the beach at Lake Pedder, 1955; by Jack Thwaites and family; State Archives of Tasmania, Item NS3195/1/1217.

Plate 10 – Rally at Hobart Town Hall to form the United Tasmania Group; Richard Jones (foreground) and Laird behind on far right, March 1972. State Archives of Tasmania, Item NS6449/1/12.

Plate 11 – At Lake Pedder in 1971 to make a film for the Tasmanian Government's Film Unit (left to right Lynne Weidendorfer, Patricia Giles, Olegas Truchanas. Harry Buckie, Ray Barnes, Frank Bolt, Max and Thedda Angus, Beverley Dunn). State Archives of Tasmania, Item NS6449/1/1.

(Crowley 2008). Contesting Tasmania's Legislative Assembly election in April, the UTG unveiled its radical 'New Ethic' manifesto, which included an undertaking 'to regulate our individual and communal needs for resources, both living and non-living, while preventing the wholesale extraction of our non-replenishable resources for the satisfaction of the desire for profit' (UTG 1972a, p. 2).

Laird was selected by the UTG as one of its candidates in the seat of Denison (central Hobart) in the 1972 state election. His candidacy biography describes Laird as having 'valuable knowledge of governmental activities and requirements' plus having done 'extensive scientific surveys of plants birds and mammals' along with membership of the Australian Conservation Foundation (UTG 1972b). Of the dozen UTG candidates, Laird scored the second highest number of votes, close to winning a seat. He stayed with the UTG for a few more years and, although he did not contest any further elections, he occasionally attended party branch meetings in Hobart. The minutes of one meeting on 3 March 1974 record Laird advising 'we should not lose sight of bread-and-butter issues – employment etc', suggesting that he was keen to broaden the UTG's policy agenda to maximise its electoral appeal (UTG 1974).

The Pedder saga also directly involved the TGFU, although apparently not Laird formally in this realm. The TGFU was tasked in early 1971, at the apparent request of the Minister for Lands and Works, to film and photograph Lake Pedder for archival purposes 'before it disappears to make way for the greater Lake Pedder' (Tasmania, Department of Film Production 1971). The film was made by TGFU manager Raymond Barnes, but according to the biographer of participating artist Patricia Giles, 'the film unit sent the wrong gear (sabotage was feared, from either dislike of Ray or his cause) and the result was not very successful' (Alexander 2019, p. 111). Featuring known anti-dam artists including Olegas Truchanas and Max Angus (pl. 11), the film risked arousing controversy. Although carefully scripted to avoid taking a stance on the dam, the film would prove valuable in being repurposed by those campaigning to save, and later restore, Lake Pedder.

The situation in late 1971 became politically contentious when Barnes, who in his leisure time had occasionally joined Giles, Angus and others for *plein air* painting on the shores of Lake Pedder, took the initiative to propose using the aforementioned artworks for a public exhibition at the Tasmanian Museum and Art Gallery. The proposal troubled the State Premier, who advised his Minister that 'it would seem to be a needless aggravation of the present situation' (Tasmania, State Premier 1971), and approval was given only after the state cabinet considered the matter with the proviso to 'ensure that the publicity for the Exhibition, especially involving the Government, is kept to a minimum' (Tasmania, Minister for Lands and Works 1971). Incongruously, however, the government had no problem in the lead-up to the state election condoning the HEC's expenditure on a massive, pro-dam advertising campaign. The 1971 Pedder photographs, film and paintings would later become valuable tools for the campaign to restore the lake, which began as soon as 1973 when the TGFU's film was sought by the Commonwealth's public inquiry into the controversy (Barnes 1973).

After Truchanas tragically died in a canoeing accident on 6 January 1972 on the Gordon River, just before Pedder's inundation, Laird co-edited an illustrated book memorialising the gifted photographer's plea for wilderness conservation. In his editorial preface, Laird closes with comments that implicitly acknowledge his own approach to what he calls 'the emergent conservation ethic': 'protective attitudes to our existing wilderness need to be intensified and fortified by concentrated studies likely to influence public opinion. In these senses, this work is a most valuable addition to the literature of conservation, exploration and the art of photography' (Angus & Laird 1975, p. 7).

Without what they perceived to be suitable films from the TGFU, campaigners for saving Lake Pedder decided to create their own, making among the very first, independent environmental activist films in Australia. Peter Sims, who was secretary to the SLPNPAC, made a pioneering documentary *Tasmanian Wilderness* (Sims 1972), which follows a party of bushwalkers exploring the lake that the narrator describes as 'the jewel of the south-west'. Extensive footage of Pedder's quartzite sand dunes, flanking mountains and inquisitive wildlife is accompanied by evocative commentary such as the 'intangible values of this wilderness area' with explicit reference to the threat of the dam. The third segment of Sims' film is particularly striking, being devoted to Tasmania's Aboriginal history, and whilst not acknowledging their *living* culture it at least affirms, as Laird had done, that Tasmania was not an unpeopled wilderness. The film closes with the poignant injunction, 'the study of this past race could influence our survival'. The film was shown widely to Tasmanian and mainland audiences, with over 12,000 viewers in Tasmanian schools and towns in 1972–1973 (Sims 2012, p. 145). A second independently made film with a more overtly political stance, entitled *Struggle for Pedder*, made in 1974 shortly after the inundation, was produced by Peter Dodds and Ross Matthews who wished to highlight not only Pedder's scenic beauty but its scientific values.

In the wake of the Pedder controversy, the TGFU came under unprecedented pressure to make films publicising hydro-dams and other developments. It wouldn't, however, be the first time that documentaries were exploited to promote such an agenda. For example, *Timber Makes News* (1947) made by United Documentary Films on behalf of the Australian Newsprint Mills to showcase its Tasmanian newsprint mill – at the time this company was controversially seeking to excise part of Mount Field National Park for its expanded operations. In the wake of the Pedder polemic, a TGFU example is *Gordon Power* (1978), one of the last TGFU films ever made, which was produced for the HEC to marvel, according to the narrator, at the 'improved' Lake Pedder as a 'new, vital energy source' with the 'added bonus of a sporting and recreational playground'. This film was designed not only to help the HEC maintain public support after the Pedder

controversy but to help assuage public opinion about the HEC's recently announced plans to impound the Franklin River. Draft iterations of the film script show that the HEC's publicity officer removed pro-environmental language such as 'wilderness' that had been introduced by the TGFU, likely to deflect public attention from the environmental losses of the Pedder dam (Tasmania, Department of Film Production 1977). The archival files and the film credits do not suggest Laird was personally involved in *Gordon Power*.

Another, more subtle, example of this shift in the TGFU's films is *Tasmanian Wild Life*, released in 1973 shortly after the flooding of Lake Pedder. It, too, was commissioned by the HEC with the aim to depict it as environmentally responsible. The brief from the HEC to the TGFU explained that the film should not merely reveal the wildlife of Tasmania but, to quote, 'show what the HEC does in this regard. Some examples that could be mentioned include: 1) No dogs or cats allowed in HEC construction towns; 2) water levels in lakes is (sic) kept fairly constant, therefore fish and birds do not have to contend with changing diet etc.; 3) no air pollution; 4) no spoiling of rural areas (coal mines); 5) HEC work with Parks and Wildlife and similar institutions' (Hydro-Electricity Commission 1972). The final version of the 25-minute film contains several nods to the HEC's interests, including the opening scene of boaters on a hydro-lake with the accompanying narration 'this high and rugged section has abundant rainfall and provides ideal locations for hydro-electric developments'. It goes on to congratulate the HEC for patrolling its hydro-lakes to rescue 'any wildlife becoming trapped by rising waters'. Laird is not listed in the film's credits.

Forestry was becoming equally controversial in the 1970s, especially due to the advent of industrial wood chipping, along with site-specific disputes including a proposal in 1972 to log Precipitous Bluff and the government's revocation in 1976 of extensive forested land in the Hartz Mountains National Park (Gee 2001, p. 187). Although most associated with its stance on Lake Pedder, the UTG also rallied against forestry, and earlier, in 1970, Truchanas himself successfully fought to create the Denison River Huon Pine Scenic Reserve (Gee 2001, p. 8). As with hydro-dams, the TGFU was tasked by the government to make a pro-forestry film to help placate public unease. The resulting *Forester's Island* (1973) is a sales pitch, with the narrator declaring 'today, the forest is the story of management and conservation, of man and his environment'. The 17-minute film boasts of the benefits of wood chipping in converting 'large areas of decadent, lower quality forests' into $30M of annual export income for Tasmania and the opportunity 'to fully utilise these poorer trees and replace them with vigorous, new forests'. The disingenuous movie ignores the non-economic values of forests apart from the closing scenes of families enjoying the recreational benefits of visiting the bush.

CONCLUSION

In the history of nature conservation and conflict we sometimes lose sight of the importance of individuals. Norman Laird's career matters not merely because of his achievements in filmmaking and other creative outputs but because his life raises larger issues about how environmentalists in conflicted positions can pursue their cause. Laird's career is inseparable from the history of the TGFU that operated from 1946 to 1977, and the role of documentary films in mediating and conveying understandings of the natural environment. Like Truchanas, who had to subtly campaign with the camera against his employer's plans to dam a lake, Laird had to adroitly reconcile his personal values with his professional responsibilities. Until the late 1960s, this reconciliation could be sustained for Laird for a combination of several possible reasons, including that he could quarantine his extra-curricular activities from his government film work; the assumption that such films (once) had an apolitical, utilitarian character; and thirdly, that nature conservation could be promoted through films that celebrated Tasmania's scenic beauty and unique wildlife.

By the late 1960s Tasmanian society was becoming more environmentally aware and divided over the fate of its natural heritage, a shift occurring elsewhere in Australia (Richardson 2023, pp. 64–81). In this context, government-sponsored documentary films for the HEC, Forestry Commission and other resource exploiters to bolster their 'social licence' (Lester 2016) became less easily framed as unbiased, public information. Conversely, environmentalists increasingly realised visual marketing could publicise their counter story. Whilst the campaign to save Tasmania's Franklin River is most strongly associated with this shift, such as the use made of Dombrovskis' famous photo *Morning Mist, Rock Island Bend* (1979), along with several documentary films including *The Last Wild River* (1978), *Franklin River Journey* (1980) and *Huon Cry* (1983), we should recognise this shift began earlier with the Lake Pedder campaign, such as with Sims' film *Tasmanian Wilderness* (1972). Indeed, arguably the seeds were planted even earlier in bushwalking films such as *Five South West* (1959).

The demise of the TGFU, which was replaced in September 1977 with the short-lived Tasmanian Film Corporation with an explicit commercial mandate beyond documentary films, was caused by many factors. It had been chronically under-resourced for some years, with its manager Raymond Barnes once bemoaning, 'We are trying to fulfil 1975 orders and requests with 1950 technology, equipment and ideas' (Barnes 1975). The State Premier came to prefer a model, based on South Australia's Film Corporation, that would foster greater collaboration with the private sector. The institutional change coincided with the end of Laird's career; he died shortly afterwards, at age 63 on 21 June 1978. Perhaps fittingly for his personal passions, the last ever government film Laird worked on was *Waiting for a Shearwater* (1978), a sensitive look at the work of national park rangers on Tasmania's Furneaux Islands.

This paper will hopefully help to improve awareness of the subtle, and later not so subtle, environmental activism of one of Tasmania's premier filmmakers and authors. Laird's career, and the work of the TGFU, illustrate the salience of visual storytelling for public discourse on environmental issues. Fittingly, the longest and most detailed documentary film on Tasmania's history, *As Time Goes By – A Hundred Years of Life in Tasmania* (Peter Richman Productions 1993), features a closeup of Laird, armed with his movie-camera, on the DVD cover (the same image as plate 7).

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A VERY GREAT IDEA? ACCLIMATISATION OF ANIMALS IN TASMANIA 1862–1895

by Stefan Petrow

(with seven plates)

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The organised acclimatisation of animals from one geographical region to another was a widespread movement from the mid-nineteenth century and was common in the Australasian colonies. Previous studies have underplayed or ignored Tasmania's acclimatisation experience as shown by the activities of the Tasmanian Acclimatisation Society, formed in 1862 by a small band of enthusiasts for cultural and economic motives. Tasmanian acclimatisers introduced pheasant, partridge, quail, rabbit, hare and deer for hunting, and sparrows and starlings for the familiarity of their songs and to kill insects. When introduced animals reacted in unexpected ways and became pests, it demonstrated the limits of scientific knowledge, the adaptability of introduced species, and the vulnerability of native species and the Tasmanian landscape to new arrivals. Always evoking ambivalent attitudes, critical assessments, most notably by Morton Allport and Louisa Anne Meredith, focused on acclimatisation's unthinking interference with nature for selfish reasons and its agricultural and ecological impact. Newspapers provide the major source to reveal the motivations and actions of acclimatisers and evidence shows that trial and error acclimatisation proved not to be the 'very great idea' that enthusiasts claimed.

Key Words: Tasmania, acclimatisation, Tasmanian Acclimatisation Society, Morton Allport, John Woodcock Graves, Louisa Anne Meredith, introduced species.

INTRODUCTION

In his seminal book *They All Ran Wild*, first published in 1969, farmer and environmentalist Eric Rolls (1984, p. 270) described members of acclimatisation societies in damning terms: 'there was never a body of eminent men so foolishly, so vigorously and so disastrously wrong'. Referring to the exotic or foreign animals and plants that these members introduced in the mid-nineteenth century, Rolls declared that only lack of money and 'the failure of some animals to adapt' saved Australia from 'these societies' worst enthusiasms. Rolls mainly directed his criticisms at the Acclimatisation Society of Victoria (ASV), which received the most financial and political backing of any of the acclimatisation societies that were formed in New South Wales, Tasmania, South Australia, Queensland and New Zealand from 1860 to about 1875 (Gillbank 1980, McDowall 1995, Osborne 2008). After this period the societies tended to decline, struggled to find funds and became administratively lacking, while others disappeared or changed emphasis (Andrew & Griffith 2016). But the idea of acclimatisation did not disappear and continued to have adherents to the end of the nineteenth century and beyond.

In fact, after 1860 acclimatisation was not confined to members of acclimatisation societies or scientists. As Minard observes, farmers, pastoralists, hunters, recreational and commercial fishermen, businessmen and journalists among others 'contributed to, transformed and conditioned the social practice and science' of acclimatisation (Minard 2019, pp. 42, 134). He points out that some animal pests like deer, rabbits, cats and foxes had been introduced by early colonists before the formation of acclimatisation societies. Moreover, Minard asserts that after 1860 leading naturalists and acclimatisation theorists of the ASV did not seek to harm local environments, were not simply alienated from Australian nature, and generally believed in practising acclimatisation that restored and improved nature with animals from Britain, Europe, Asia, South America and Africa. British species predominated because they were 'easy to acquire in large numbers, not because of an overwhelming desire to transform the Australian colonies into a facsimilie of Britain' (Minard 2019, p. 2). Reacting in 'new and unpredictable ways', introduced animals demonstrated 'the limits of scientific knowledge', their adaptability to a new environment and the vulnerability of native species and the Australian landscape to their arrival (Minard 2019, pp. 134–136).

This paper focuses on Tasmania's relatively unstudied acclimatisation experience with animals, which was similar in some ways to Victoria's from 1860. Similarities included that Tasmania experienced acclimatisation of both domesticated and exotic animals by early colonists; its acclimatisation society was based on the ASV model (but with exiguous government support); British species were the most sought after, but some species came from Asia; and several soon became pests. But the differences between Victorian and Tasmanian acclimatisation efforts need to be kept in mind as I discuss what Tasmanian acclimatisers achieved.

Context

It is important to highlight six general points for context. Firstly, while Tasmania had a tradition of amateur scientific study through scientific societies like the Tasmanian Society and the Royal Society of Tasmania, their members constituted only a small number of essentially amateur scientists (Hoare 1969, pp. 207–208). In Victoria, the University of Melbourne had been established in 1853 and had prominent well-trained scientists able to theorise about acclimatisation and its consequences, but the University of Tasmania was not established until 1890 and lacked that avenue of expertise (Minard 2019, p. 23). Critics were not lacking and, in the *Papers and Proceedings of the Royal Society of Tasmania* and in newspapers, highlighted the deleterious impact of some introduced species and expressed disillusionment with acclimatisation.

Secondly, arguably of all the Australian colonies, Tasmania was best placed for successful acclimatisation: 'we possess a climate in which any form of animal life may thrive: a vegetation suited to most, and abundance of all land and water conveniences—bush and plain, shallows and deeps, smooth water and currents … a home for the multiform bounties of nature' (*The Mercury*, 26 February 1870, p. 3). On this reading, Tasmania was a perfect laboratory for the Tasmanian Acclimatisation Society (TAS) and private individuals, sometimes working together, to experiment with introduced animals. The TAS usually rates only a passing reference in acclimatisation literature, but this article demonstrates that it was more active from its formation in 1862 to about 1876 than previously thought, largely due to the enthusiasm of local lawyer John Woodcock Graves and some politicians. This supports Osborne's view that often 'political and financial support for acclimatization depended on a few key people' (Osborne 2000, p. 143). Osborne (2000, p. 137) further observed that, for British acclimatisers, acclimatisation 'tended to signify a transfer of so-called exotic organisms from one location to another with a similar climate' and the Australian colony with the climate most approximating Britain was Tasmania. This was a major reason why British species were favoured by Tasmanian acclimatisers, who eschewed more outlandish animals from places like Africa and South America (Minard 2019, pp. 28–31, Low 2001, pp. 30–31).

Thirdly, Tasmania had not undergone the explosion of population that Victoria did after the gold rushes with their consequent destruction of the environment. Certainly, the rapid growth of sheep farming, so vital to the economy, had wrought changes to the Tasmanian landscape, but intensive mining and forestry had not yet fully developed (Hartwell 1954). Sheep farmers faced much destruction from introduced rabbits, but opposed dangerous solutions like introducing foxes that might attack their sheep and not the rabbits.

Fourthly, from about 1858 to 1872 Tasmania suffered an economic depression and desperately needed to attract new business ventures (Meikle 2010). Acclimatising animals that added something new to the economy – like Angora goats – were generally supported. Introducing bird species that could deal more effectively with insect pests and strengthen the viability of orchards was supported by agriculturists and gardeners, but some, such as sparrows and starlings, soon became pests themselves. Dunlap (1993, p. 29) rightly argues that 'sentiment and sport were the dominant motives' in Australian acclimatisation, but in Tasmania's case this is not true, as Dunlap claims, that 'economic rationales were conspicuous by their absence'.

Lastly, Tasmania, first settled as a penal colony, suffered the stigma of its origins long after the 1850s and actively sought in various ways to change its image to one more befitting of a typical British imperial colony as Walker (2008) shows. Regarding this, countless visitors had described Tasmania as the most English of the Australian colonies, and it continued to develop its Englishness after 1860 as one way of removing the hated stain of convictism and attracting immigrants and visitors. English novelist Anthony Trollope (1875, p. 154) put it in the strongest terms after his visit in 1871–1872: 'Everything in Tasmania is more English than is England herself'. Introducing game animals for hunting like hares and deer contributed to the Englishness of Tasmania, but those animals also caused damage to agriculture and the environment.

This paper does not discuss Salmonidae acclimatisation, which after 1850 succeeded in introducing trout but not salmon (Harrison 1997, Mollison 2020). The Tasmanian government, supported by the Royal Society of Tasmania, invested in Salmonidae, which could be exported to other colonies, create employment, attract angler tourists and 'confer a prominence and distinction on Tasmania, which cannot be anticipated from almost any other source' (House of Assembly Journal 1862, Paper 68, p. 5; Lien 2005, p. 664). Private acclimatisers like Morton Allport with English perch *Perca fluviatilis* and Captain William Langdon with tench *Tinca tinca* achieved what one piscator called a 'triumph of acclimatisation' (*The Mercury*, 18 July 1874, p. 3), but they underestimated the impact of introduced fish on waterways and native species.

While sources for understanding the divisions and debates arising from Salmonidae acclimatisation are numerous if tendentious, hardly any sources exist for the TAS or for major acclimatisers, but newspapers, swept up in the possibilities of acclimatisation, frequently reported on new importations and their impact. This paper focuses on British game species, beginning with early acclimatisation efforts to about 1862, the role of the TAS from 1862 to 1876, and the acclimatisation of certain species. A concluding section discusses how various critics assessed the impact of introduced animal species and why interest in acclimatisation grew in the 1890s.

ACCLIMATISATION IN TASMANIA TO C.1862

Acclimatisation was practised by individual early settlers as they built homes and economic futures in the new colonies (Morgan 1992). They brought many species with them as farm and domestic animals that had never been released in the New World. Some settlers also brought birds for their

songs or to deal with insect pests, or other game species for sport. For instance, in 1826 the Tasmanian Game Association was formed to import and propagate English game, especially pheasant, partridge and hare (*Hobart Town Gazette*, 22 April 1826, p. 2, Rolls 1984, pp. 270–271). Soon after 'a trickle' of other animals entered the colony –deer, partridge, hare, monkeys and various birds among them – but thereafter such introductions were even more episodic and random (Gillbank 1980, p. 257). Only wealthy individuals could afford the 'great' cost of importing game and this may have limited numbers (*Tasmanian*, 7 July 1837, p. 2), as no one person could bring out the quantity of animals required to acclimatise successfully in Tasmania despite the advantages of climate and vegetation. Another disincentive was the possibility of animals not being cared for on the ship and dying on the long voyage out (*Hobart Town Daily Mercury*, 9 March 1859, p. 3). However, rabbits had acclimatised very quickly, but deer and pheasant less so.

The *Hobart Town Daily Mercury* (14 March 1859, p. 3) observed that, although Tasmanian settlers were 'so thoroughly British in their tastes, habits and feelings', they had not moved very energetically to introduce British game or songbirds. Birds that had been introduced (European blackbird, thrush and skylark) were placed in avaries and survived 'remarkably well' as pets. The *Hobart Town Daily Mercury* (p. 3) urged wealthy landed proprietors to introduce British game liberally and advised that with 'care and attention in their distribution and location they would thrive and multiply in their natural liberty'. In addition to bolstering deer and pheasant stock, hares and partridges should be introduced, thereby improving their own properties and the wider colony as had occurred in Victoria.

In August 1859 one wealthy magnate, Henry Frampton Anstey, representing his local area of Oatlands in the House of Assembly, moved that it was 'desirable to encourage the introduction and propagation of all kinds of game from Great Britain and other countries' (*Hobart Town Daily Mercury*, 19 August 1859, p. 2, *Hobart Town Advertiser*, 20 August 1859, p. 8). Noting that several acquaintances wanted to stock Tasmania with British game, Anstey requested Attorney-General Francis Villeneuve Smith to introduce a Bill to protect 'the increase of all such imported game from destruction'. Anstey's motion was passed.

In September 1860 Smith introduced a *Protection of Imported Game Bill*, which passed easily through Parliament and protected for five years species such as pheasants, partridges, grouse and hares (*The Mercury*, 7 September 1860, p. 2). One dissenting voice, the *Launceston Examiner* (8 November 1860, p. 2), wondered why, when stringent game laws were being relaxed in Europe, they were introduced into Tasmania 'in all their rigour', including £5 fines for each game bird or animal killed. While the *Launceston Examiner* thought it 'impolitic to enact laws which will be generally disobeyed, cannot be enforced, and which confer no compensating benefit', the wealthy landowners had advanced a major step in their acclimatising quest for British game and making Tasmania, prominent acclimatiser John Woodcock Graves later remarked, 'as near as possible like Old England' (*The Mercury*, 16 June 1862, p. 2). Anstey's successor as member for Oatlands, James Maclanachan, set an example by releasing pheasants into shrubbery adjoining his property Ballochmyle near Tunbridge. *The Mercury* (27 September 1861, p. 3) urged other 'wealthy magnates' to follow Maclanachan and make their mansions and grounds 'still more ornamental and attractive by the introduction of British game'.

THE TASMANIAN ACCLIMATISATION SOCIETY 1862–1876

Scientific societies were one possible vehicle for acclimatisation in the Australian colonies. Formed in 1843 and amalgamating with the Tasmanian Society in 1848, the Royal Society of Tasmania had always shown an interest in acclimatisation and received donations of publications from acclimatisation societies around the world (*The Mercury*, 17 October 1871, p. 3, Winter 1993, p. 63), but the Royal Society did not play a central role in the late nineteenth century as Lien (2005) has implied. While the TAS concentrated on introducing new animals more for sport than increasing the 'food supply', the Royal Society's prime focus was on exchanging plants and seeds with acclimatisation societies in various colonies and abroad (*The Mercury*, 17 September 1867, p. 2, 19 November 1867, p. 3, 18 July 1876, p. 3, *Tasmanian Times*, 7 April 1870, p. 2). *The Mercury* (7 February 1872, p. 2) judged that the chief aim of Royal Society Fellows was not, as some alleged 'to flatter their own vanity', but to encourage 'scientific discoveries' and promote 'acclimatisation and the culture of vegetable products suitable to the climate'. Whether by the Royal Society at its Botanic Gardens, by individuals or by accident, many useful plants and not so useful plants now weeds from other places made their appearance in Tasmania by the 1870s (Spicer 1877, Rozefelds & McKenzie 2005), but they are not the focus of this paper.

Two members of the Royal Society of Tasmania were also members of the TAS, but their differences were more interesting than their similarities. One was Hobart lawyer Morton Allport (1830–1878, pl. 1), an enthusiastic naturalist respected for his knowledge of Tasmanian zoology and botany (Stilwell 1969, pp. 28–29), 'loving Science truly as being the handmaid of Nature' (*The Mercury*, 1 October 1878, p. 2). He became a member of the Royal Society of Tasmania in 1849 and published numerous articles in the society's journal, *Papers and Proceedings*. He corresponded widely with scientific men in Europe and was made a fellow of the Linnean and Zoological societies in London and a foreign member of various European scientific societies. While his letterbooks show that he sent many specimens of mammal, bird, molluscs, seeds and insects (and also Aboriginal human remains) to European museums, his main acclimatisation obsession was with English fish, most notably salmon and perch, for which he was made an Honorary Life Member of the Otago Acclimatisation Society and the Zoological and Acclimatisation Society of Victoria (Stillwell 1969, Mollison 2020). The Reverend

Plate 1 – Morton Allport preparing a specimen. Source: Allport Museum and Museum of Fine Arts, Libraries Tasmania. https://stors.tas.gov.au/AUTAS001139593974j2k

J. Tenison Woods named a new genus of Nudibranchiata (sea slug) *Allportia* as 'a slight mark of appreciation of his great services to science and acclimatisation in Tasmania' (*The Mercury*, 20 April 1876, p. 3).

Like Allport, John Woodcock Graves (1829–1876) was a lawyer whose keen interest in animals and plants dominated his later life, but his links with the Royal Society were not as strong as Allport's. Described by his anonymous obituarist as 'learned, genial and eccentric', he was 'a thorough sportsman' in hunting game and was 'passionately fond' of greyhounds, which he bred (*The Mercury*, 31 October 1876, p. 2). Graves remained TAS Secretary long after it became 'defunct' and his obituarist held that Tasmania was 'greatly indebted to his exertions in preventing the extermination of many native animals'. He also introduced or encouraged the introduction of many foreign animals to Tasmania for hunting above any other reason. He contributed to *The Mercury* 'in various ways for many years, and, from his florid style of writing, it was not difficult to detect his effusions'. Based on the evidence of his obituary revelation, many *Mercury* pro-acclimatisation editorials might well have been written by Graves. According to Allport (Allport Collection 1874), Graves wrote letters to newspapers signed 'Fisherman', but he gave considerably more public and private attention to birds and animals than fish. Graves strongly denounced early settlers for having 'assisted to exterminate the blacks' and took 'the warmest interest' in the 'welfare' of Truganini, even naming his second daughter after her in 1864 (*The Mercury*, 31 October 1876, p. 2).

A turning point for acclimatisation came in January 1862 when the proprietor of *The Argus* newspaper, Edward Wilson of the ASV, spoke at a meeting of those interested in the acclimatisation of animals in Tasmania. Calling this 'a very great idea', Wilson marvelled at the wide range of 'useful animals' that could be introduced into Australia (*The Advertiser*, 18 January 1862, p. 3). He opined that many indigenous animals like the wombat and the kangaroo were 'almost valueless for commercial purposes', while many animals that had been acclimatised, such as the ox and horse, were of 'a useful kind, had a commercial value, and had been wonderfully successful'. The world's leading acclimatiser, Isidore Geoffroy Saint-Hilaire of Paris, estimated that of the 140,000 extant animal species, only 43 species had been 'domesticated'. Wilson had no doubt that 'there were many and various animals, which would add to our happiness, our comfort, and our enjoyment, in some form or another', but no 'systematic scheme' of acclimatisation had yet been carried out in Australia.

Wilson contended that in looking at 'the list of animals useful to man' they should not be limited to 'wealth producing animals' (*The Advertiser*, 18 January 1862, p. 3). The happiness of children would be much expanded if they were 'surrounded with the various beautiful forms of animal life', which must 'necessarily have an improving and elevating tendency'. How much would it 'lighten the toilsomeness' of a wayfarer's journey if he saw around him 'the various engaging forms of animated nature, the fish sporting in the river, the birds carolling in the trees, and an endless variety of objects'. While most attention had been devoted to salmon and alpacas, Wilson knew he courted ridicule by lauding the qualities of lesser species like fireflies and glow-worms. Sheep farmers, who regarded the sheep as 'sacred', opposed the introduction of alpacas as a way of 'superseding' sheep, but Wilson claimed acclimatisation was not about superseding but adding to a colony's wealth and alpacas would 'feed over the head of the sheep' and eat what the sheep would not. Wilson asserted that 'the essence of acclimatisation' was to choose animals that 'would not prey on each other but derive their sustenance from varying herbage' and avoid an 'acrimonious struggle'.

On his visit Wilson brought with him, at the request of renowned Victorian naturalist Baron Ferdinand von Mueller, six native bears (koala *Phascolarctos cinereus*), 'more properly called the 'Tree Sloth', which was 'perfectly harmless, and very eccentric and amusing, and lived on gumleaves' and was not a native of Tasmania (*The Advertiser*, 18 January 1862, p. 3). Although its flesh was 'not very palatable', it would constitute 'a very good meal' when someone was 'lost in the bush' and had nothing else to eat. Other animals Wilson suggested as suitable for Tasmania included the laughing jackass (kookaburra), the kingfisher and the lyrebird. As for who should carry out an acclimatisation scheme, he advocated 'the necessity of

conjoint aid from public and private sources.' But what was far more important than money was to attract men 'whose hearts were in the cause' and to appoint an 'equally interested' Honorary Secretary. Once 'public interest' grew, government grants of land and money and donations of 'animal life' would follow.

The meeting decided to form a TAS based on the model of the ASV (*The Mercury*, 18 January 1862, p. 3). Amateur scientists associated with the Royal Society of Tasmania like Dr Robert Officer, Morton Allport, Premier TD Chapman, Dr James Agnew and Captain William Langdon, offered their support. Allport wanted the TAS to be a branch of the Royal Society and the committee of the Royal Society to be the committee of the TAS. Without giving any specific reason, the meeting decided to operate independently of the Royal Society, but the two bodies would assist each other where possible. Allport was appointed Secretary, Thomas Giblin Treasurer and Governor Thomas Gore-Browne assented to becoming Patron. Early members or subscribers included the two Supreme Court Judges, eight members of the Legislative Council and ten members of the House of Assembly, clergymen, farmers, pastoralists, lawyers, doctors and businessmen, including the owner of *The Mercury* John Davies, all upper-class members of society or aspirants to that exalted status (Tasmanian Acclimatisation Society 1862a).

Chapman did his best to support the new society by moving a motion in the House of Assembly that £100 be granted to it conditional on the TAS raising £200 by private subscription (*The Mercury*, 20 January 1862, p. 3). He argued that the Assembly 'stood in the position of landlord of one of the finest estates possible' and the grant would help raise the 'value' of the land by introducing European birds and animals. While several members supported the Society's work, they were not prepared to vote for public funds at a time of economic downturn. Charles Meredith pointed out that early settlers 'improved' their flocks without government aid and the acclimatisers should subsidise the importation of birds and animals themselves. Chapman withdrew his motion.

The major newspapers were far more encouraging. *The Advertiser* (6 February 1862, p. 2) thought increasing domestic animals would provide employment for a growing population and increase exports. Introducing European singing birds would 'change the silence and the loneliness of our bush for the music and the hilarity of English groves'. *The Advertiser* especially favoured experimenting with alpacas in Tasmania's 'hitherto worthless' western districts and with the Japanese silkworm so a silk industry could develop. *The Mercury* (21 February 1862, p. 3) applauded the society's aim 'to systematise the hitherto too desultory efforts of individuals to promote the work of acclimatisation'. But without government support the efforts of individuals like Allport would be 'instrumental in renewing our acquaintance with many once familiar forms of animal life of the old world.' An even more committed acclimatiser was Graves, who had already moved quickly to place a pair of white swans on Southport Narrows and a pair of pheasants on Partridge Island and Huon Island. *The Mercury* looked forward to the importation of more English game or 'sporting animals' like partridge, grouse, fox and hare.

The TAS proceeded to outline its objectives at length by adopting those of the ASV, which in turn were largely based on the British Society's objectives (Gillbank 1980, pp. 261–262). These included 'the introduction, acclimatisation, and domestication of all innocuous quadrupeds, birds, fishes, insects, and vegetables, whether useful or ornamental; —the perfection, propagation and hybridization of races newly introduced or already domesticated' and 'the spread of indigenous animals ... from parts of the Colonies where they are already known, to other localities where they are not known' (Tasmanian Acclimatisation Society 1862b, p. 3). The society would procure, 'whether by purchase, gift, or exchange', animals from Great Britain, the British Colonies, and foreign countries and send animals from Tasmania to those destinations 'in exchange for others' sent to it. The society intended to hold regular meetings and, more ambitiously, publish reports and transactions to disseminate 'knowledge of acclimatisation and inquiry into the causes of success or failure', but no scientific investigation or report was ever completed. Reports and correspondence would be exchanged with similar societies around the world to give 'the widest possible scope to the project of acclimatisation'. The TAS would also confer 'rewards, honorary or intrinsically valuable, upon seafaring men, passengers from distant countries', and anyone who rendered 'valuable services to the cause of acclimatisation'.

The TAS soon gave 'evidence of much energy' (*The Mercury*, 23 April 1862, p. 3). It opened correspondence with the Acclimatisation Societies of England, France, Victoria, New South Wales and New Zealand and received promises of co-operation from Victoria and New South Wales (*The Mercury*, 23 April 1862, p. 3, 14 August 1862, p. 3, 13 January 1864, p. 2). The society arranged with the Royal Society to build avaries in the Botanic Gardens, distributed fifty copies of a detailed forty-page pamphlet on acclimatisation by Scottish-born medico and naturalist Dr George Bennett and donated pamphlets on acclimatisation to public libraries in Hobart and Launceston. The editor of *the Mercury* became an essential advocate of acclimatisation. Perhaps most important of all, captains of several English vessels (the *Percy*, *Windward* and *Heather Bell*) promised to procure animals, birds and fish from England, which they did, and captains of Mauritian traders agreed to obtain some gourami, 'a most delicious pond fish', which they did at great 'trouble and expense' only to have the fish die on the voyage (*The Mercury*, 23 April 1862, p. 3). Perhaps the most regular procurer of 'various natural specimens of natural history' was Captain Henry William Harmsworth of the *Heather Bell* and *Ethel*, who did 'as much' if not more than any man 'in the cause of acclimatisation' (*The Mercury*, 6 January 1871, p. 2).

To raise money for its various projects, the TAS sent out circulars to 'leading men' seeking their support (*The Mercury*, 6 January 1862, p. 2). *The Mercury* suggested

various ways of giving 'efficient aid to the cause'. One was by supervising one of the animals introduced by the society, describing to the secretary steps taken to preserve and increase the animal and exchanging some of the progeny with members of the society. *The Mercury* thought the TAS could encourage more people to study natural history and provide information 'as to the best means of rearing particular animals or plants'. Expecting the TAS to complement private efforts, *The Mercury* noted that gentlemen farmers who imported English blood horses, bulls and rams also imported pheasant, partridge, hare, deer and 'various species of songbirds' (*The Mercury*, 23 June 1862, p. 5).

Evidence is poor on how the wider public reacted to the idea of acclimatisation that appealed to so many men of wealth and property. Probably most Tasmanians were beastly careless and thought acclimatisation was a fad that would pass, but others were less sanguine and advocated pre-emptive action. One outspoken sceptic called 'Pro Bono Publico' felt moved to express his views after seeing an 1862 *Advertiser* report that Graves intended to import two foxes and that two koalas had already been set free in the gullies of Mount Wellington (*The Advertiser*, 18 June 1862, p. 3). 'Pro Bono Publico' thought this 'mania for importing foreign animals may possibly increase' and called on Parliament to pass laws preventing 'individuals or Societies from acting as they please in such matters'. While he condoned the importation of 'harmless creatures', it was 'monstrous to suppose that any man at his pleasure' should import 'ravenous beasts or vermin of any description'. 'Pro Bono Publico' pointed out that fox hunting was not regarded as a 'boon' by farmers in England and hoped that Graves would prosecute himself 'if his foxes should happen to trespass on the poultry of his neighbours'.

As expected, without government grants and relying on private subscriptions and donations (£144 16s by August 1862), the work of the TAS was circumscribed (*The Mercury*, 14 August 1862, p. 3). The Society was unable to introduce 'many animals ... which would render food more abundant and varied' and 'might ultimately become articles of export'. As secretary, Allport kept the TAS from quickly 'falling to pieces' and was the contact point for outside enquiries (*The Mercury*, 7 October 1862, p. 5). In 1863 the Acclimatisation Society of the United Kingdom wanted to find out about the progress of acclimatisation in the British Empire and its President, the Duke of Newcastle, who was Secretary of State for the Colonies, sent a circular dispatch dated 7 August to Ministers, Governors and Consuls around the world containing a survey of ten questions in part drawn up by Edward Wilson (Lever 1992, pp. 74–5). Allport responded on behalf of the TAS (Governors Office Correspondence 1863).

The first eight questions sought knowledge about Tasmanian quadrupeds, birds, fish, insects, timber trees, medicinal plants and vegetables that might be useful to Britain (Fifth Annual Report 1865, p. 57). Of these, the most revealing was question one on quadrupeds. Allport nominated the brush kangaroo as of the most 'economic value' as its skin made 'very superior leather', but added that, 'Like most of our indigenous marsupial quadrupeds, this animal is fast disappearing before the creatures introduced from Europe'. As we will see, Allport had qualms about acclimatisation, but he could hardly express them in his response so he concluded that attempting to acclimatise the brush kangaroo 'amongst animals of higher organisation will fail'.

Question nine asked what introductions would most benefit Tasmania (Fifth Annual Report 1865, pp. 57–58). Unsurprisingly, Allport thought 'Any of the game, songbirds, or large fresh-water fish belonging to the northern temperate zone' would be 'valuable', but he feared that the future of the TAS was too uncertain to render it helpful in acclimatisation work. His fears were realised. In September 1864 he noted that the TAS had 'died a natural death, chiefly from the want of Government Aid' and a population 'too small' to keep it going (Allport Collection, 1864a, 1865). Allport told a correspondent that 'In future all our Acclimatisation work will be carried out under the Auspices of the Royal Society of Tasmania'. That was not quite true because salmon acclimatisation with which he was associated continued under the Salmon Commissioners, and Graves became the figurehead of the TAS, privately introducing a range of animals into Tasmania until his death in 1876 when the TAS faded from view (*The Advertiser*, 20 February 1864, p. 2).

In 1864 erstwhile supporter *The Advertiser* criticised the TAS for its lack of 'vigour and earnestness of purpose' (*The Advertiser*, 6 December 1864, p. 2). If it demonstrated 'the practical and national character of its objects and exertions', then Parliament might be persuaded 'to grant it a small subsidy'. Apart from the government-supported salmon experiment and the efforts of private individuals in introducing 'some few varieties of English game and English songbirds', Tasmania lagged far behind the ASV. Retaining its advocacy role, a *Mercury* editorial struck a more positive note. Acclimatisation was 'unquestionably' beneficial in 'a utilitarian sense', but also promoted 'healthful and morally and intellectually improving enjoyment' (*The Mercury*, 22 October 1868, p. 2). For humans, 'the beautiful is only second in importance to the indispensable' and the beautiful was 'so wonderfully and perfectly realised' in the 'endless diversity' of creatures that inhabited 'the land, the water and the air'. Amongst 'the highest privileges man could possess' was the ability 'to introduce living creatures where they were previously unknown, to adapt them by judicious culture to novel conditions of climate and soil, and, above all, to so improve them by systematic and appropriate admixtures of blood as to render the product of art and nature, in combination, superior to the work of nature alone'.

'The acclimatiser', continued *The Mercury* (22 October 1868, p. 2), ministered to both 'the physical wants' and 'the refined pleasures' of mankind. One lesson to be revealed by 'the study of Nature's book' was that 'no creature or product' was 'without its use and application in the great scheme of the universe'. For example, birds imported for their plumage or song could also be 'a more efficient servant of the gardener or the farmer than the stolid

human laborer', who regarded 'the little tinted or warbling aeronaut as an intolerable pest'. *The Mercury's* core point was that acclimatisation was 'to a great extent the necessary complement of high civilisation'. When Anglo Saxons fulfilled their 'destiny' and subdued 'new wildernesses', they 'must transplant' any animals, birds or fish as were 'adapted' to their homes in new lands. This editorial bears the hallmarks of Graves's zealotry for acclimatisation.

A full assessment of what the TAS members, above all Graves, achieved requires us to factor in its work on several small islands used for acclimatisation. It was asserted that one reason why acclimatisation of British game in large numbers was held back in Tasmania, was the absence of a strong law 'to preserve and protect' the likes of pheasants, partridges, deer and hare not to mention native game from 'the indiscriminate slaughter of the white man's hand and the predatory prowlings of the domestic cat' (*The Mercury*, 27 March 1872, p. 3). Pointing out that the *Protection of Imported Game Act 1865* had been extended until 1877, *The Mercury* (5 April 1876, p. 2) also felt aggrieved at 'the wholesale destruction' of imported game animals and birds by 'gentlemen' claiming to be 'sportsmen' and 'some credit for the aid they gave to the acclimatisation of English game'. Pointing out that under the *Protection of Imported Game Act* they would be regarded as 'poachers' not sportsmen, *The Mercury* put a black mark against the selfish motives of entitled acclimatisers (pl. 2).

ISLAND FOCUS

Betsey Island

Using islands for acclimatisation was one way to breed imported and native game and to protect it from the designs of man and cat, but that option was not foolproof. The most significant island from several perspectives was Betsey Island, which showed the problems faced by the TAS. At the mouth of the Derwent, Betsey Island was a mile and a half from mainland Tasmania and contained about 550 'moderately timbered' acres (*Tasmanian Times*, 16 June 1868, p. 2, Piesse 1913, pp. 132–133). In 1826 a settler called James King began breeding rabbits there with the aim of selling the skins to China and their numbers reportedly had reached 30,000 by March 1828. King's estate was bought by Captain James Bell in 1831. In November 1840 Sir John Franklin paid Bell £910 for his interest in Betsey Island, which by then was home to rabbits and quail. The quail were later killed by domestic cats, 'that very worst of all enemies to the feather tribe, and to every effort of the naturalist and the natural man' (*Tasmanian Times*, 16 June 1868, p. 3). Lady Franklin's agent in Tasmania, acclaimed naturalist Ronald Gunn of Launceston, kept the island 'plentifully supplied' with rabbits (*The Mercury*, 21 February 1862, p. 3).

Seeing the island's potential, in 1865 six acclimatisers wanted to secure Betsey Island on lease and turn it into 'an acclimatisation ground' like Phillip Island at the entrance to Hobson's Bay in Victoria (*The Mercury*, 8 April 1865, p. 2). The acclimatisers contacted Gunn, who was willing to lease the land without first seeking advice from England

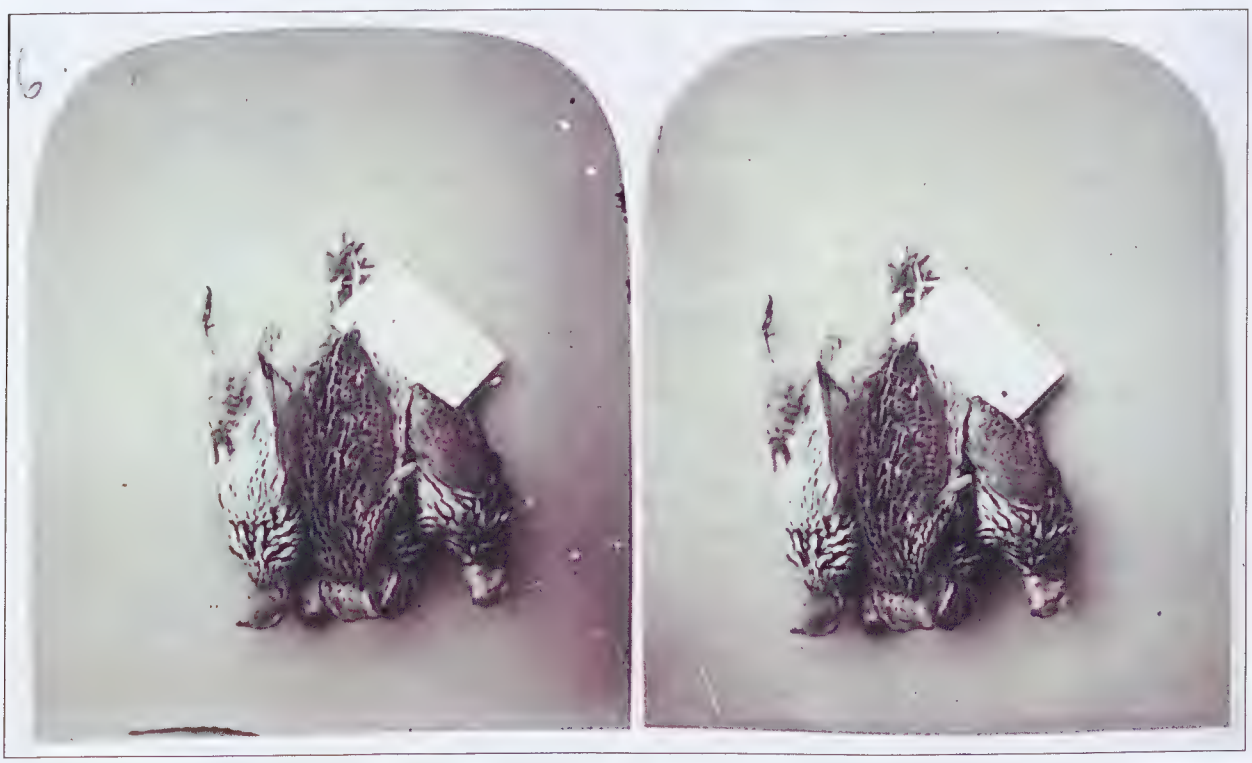


Plate 2 – A shooters bag of several quail (1860–1870). Source: Allport Museum and Museum of Fine Arts, Libraries Tasmania Item SD_ILS:630579. https://stors.tas.gov.au/AUTAS001139593974j2k

for a nominal sum of five shillings a year. A supporter of acclimatisation, Lady Franklin later sanctioned his decision and, while the TAS continued its work, presented a 'deed of gift' of the island to Tasmania (*Tasmanian Morning Herald*, 9 April 1866, p. 2, *Launceston Examiner*, 26 February 1867, p. 5, *Tasmanian Times*, 14 September 1868, p. 2). The aim was to stock Betsey Island, renamed after its donor as Franklin Island (sometimes referred to as Lady Franklin Island), with native game to prevent its 'extinction', to acclimatise 'British and Foreign Game' and to employ a gamekeeper (*The Mercury*, 13 June 1865, p. 1, 23 October 1865, p. 3).

The acclimatising projects would be largely funded by donations from subscribers to the Franklin Island Fund, but in September 1865, on a motion by Thomas Gregson, Parliament was asked to grant £100 towards the gamekeeper's salary (*The Mercury*, 8 September 1865, p. 3). Declaring this to be 'a Tasmanian matter altogether', John Davies supported the motion and believed the island 'would become most valuable ... for the rearing of game and other animals not indigenous to the country'. When MHA for Westbury Adye Douglas questioned why money should be voted 'for the benefit of one or two gentlemen' who should pay for their own gamekeeper, Gregson responded that 'this island was entirely to be kept up for the benefit of the public' and Dr Officer replied that the trustees of the island were 'willing to be accountable to this House'. Gregson's motion was passed, and the money was to be handed over to the trustees of the TAS 'for the purposes of the preservation and breeding of imported game'.

As secretary of the TAS, Graves organised a visit to the island in September 1865 to take plant-roots, slips or seeds, flowers, trees or grasses for 'cultivation by the Gamekeeper' (*The Mercury*, 30 August 1865, p. 1). By December pheasants felt 'quite at home' amongst the 'luxuriantly' growing English and native grasses and deer were in 'excellent condition' (*The Mercury*, 28 December 1865, p. 2). Later the seed merchant Charles Frederick Cresswell donated grass and clover seeds and the Royal Society gardens and nurseryman Edward Lipscombe donated berry bearing plants and shrubs (*The Mercury*, 4 October 1876, p. 2). The gamekeeper's job was to kill cats, eagles and hawks to allow brown quail to return and rabbits, hares, cocks, pheasants and partridges donated by the ASV and TAS members – including Graves, James Maclanachan, Captain William Langdon of Montacute and John Bisdee of Hutton Park – to survive (*Tasmanian Times*, 14 September 1868, p. 2, 14 March 1870, p. 2, *The Mercury*, 30 May 1866, p. 2, 3 June 1867, p. 2).The attention and support given to the Franklin Island Fund caused consternation amongst some members of the quiescent TAS (*The Mercury*, 30 May 1866, p. 2). At a meeting of the TAS in 1866, Treasurer Morton Allport queried why two societies with similar aims should exist. Graves stated that, after Lady Franklin had ceded the island to Tasmania, he contacted various men, who contributed £97 17s to developing it for acclimatisation purposes. When adding Graves' own money, a total of £145 17s 10d had been spent on the island. The meeting agreed that the Franklin Island Fund should merge with the TAS. Dr Officer thanked Graves 'for the energy he had displayed, and for the trouble he had taken in enforcing the claims of the Society', which would 'not have been resuscitated for some time to come'. John Davies said that they had 'a permanent depot established now which they would never have had but' for Graves.

In 1868 Franklin's Deed of Gift named the following Trustees to manage the island – Dr Officer as Chairman, Gunn, Allport, Graves, the Tasmanian Treasurer (then TD Chapman) and as ex officio members the Mayor of Hobart and the Surveyor-General of Tasmania. Allport and Gunn were the Treasurers and Graves was the Honorary Secretary (House of Assembly Journal 1868, Paper 87). Finding subscriptions inadequate to keep paying for a gamekeeper, in September 1868 TAS member James Lord moved in the House of Assembly for a grant of £60 to the Franklin Island trustees to pay for the gamekeeper (*The Mercury*, 28 March 1868, p. 1, 18 September 1868, p. 2). One of the trustees, Dr Officer, supported the motion as a 'nominal' way to recognise Lady Franklin's gift. Pointing out that much expenditure had been devoted to the 'the salmon experiment', John Balfe thought the TAS work was equally 'useful' and withholding this 'reasonable' vote 'would be productive of loss to the colony'. Although John Davies had donated a year's printing in his *The Mercury* newspaper for the Franklin Island Fund and had supported an earlier grant, he opposed the vote and regarded the TAS 'to some extent as part and parcel of the Royal Society'. Attorney-General William Lambert Dobson snidely remarked that the only person known to be a member of the TAS was Graves, who made 'a considerable amount of fuss about it without doing much good' as his attempt to acclimatise an albino kangaroo on Franklin Island showed (*The Mercury*, 25 September 1865, p. 2, 18 September 1868, p. 7). Dobson thought Franklin Island was 'too bleak for the successful acclimatisation' of game and believed that acclimatisation was best left to individuals than to 'any society'. Lord's motion was defeated.

As the TAS received 'no support whatever from the Government' for the gamekeeper and expenses, Graves held a public auction to sell off various animals and other diverse items donated by supporters (*The Mercury*, 10 November 1868, p. 1, 14 December 1868, p. 2). The auction, which 'represented many of the descendants of Noah's Ark', 'most of the articles of provisions needed in common life' and many 'luxuries consequent on the advance of science', raised £160, enough to pay a gamekeeper's salary for two years and incidental expenses (*Tasmanian Times*, 17 December 1868, p. 2, 2 January 1869, p. 3). Graves appointed James Alexander, known as 'Old Alick', as gamekeeper to oversee the partridge, rabbits, hares, deer and pheasants (*The Mercury*, 3 June 1867, p. 2, 13 May 1871, p. 3, 10 November 1884, p. 2). Subscribers to the TAS and 'visitors from all parts of the world' seeking 'a day's sport' were able to stay in the island's 'comfortable weather-boarded cottage' without paying for board and lodging (Walch's Tasmanian Almanac 1870, p. 131, 1874, p. 148).

After initial enthusiasm waned, doubts were expressed about what had been achieved on Franklin Island. In

1875 one visitor noted that the number of game was disappointing and no one was allowed to shoot pheasants and quail on the island (*The Mercury*, 8 April 1875, p. 3). After Graves' death in 1876 Franklin Island was not used for acclimatisation and Alexander lived there in 'destitute circumstances' killing rabbits for food and selling the skins until he left due to declining health in 1884, but the rabbits continued to multiply (*The Mercury*, 1 October 1880, p. 2, 10 November 1884, p. 2, *Tasmanian News*, 30 March 1895, p. 2, *Daily Telegraph*, 2 March 1904, p. 6). Finally, in 1903 Section 15 of the *Crown Lands Purchasers' Reinstatement Act* vested Franklin Island to the Trustees of the Tasmanian Museum and Art Gallery in fee simple (*The Mercury*, 29 February 1904, p. 6). Betsey Island is now a statutory Nature Reserve managed by the Tasmania Parks and Wildlife Service.

Green Island

In April 1868 the Governor-in-Council reserved the ten-acre Green Island in D'Entrecasteaux Channel for the purposes of the TAS (*The Mercury*, 18 April 1868, p. 1, 19 May 1868, p. 2, 20 May 1868, p. 1, *Launceston Examiner*, 21 May 1868, p. 6). The lease for Green Island was granted at a rental of one shilling per year for fourteen years to Dr Officer, Dobson, Allport and Graves, who organised a steamer to take enthusiasts to plant berry-bearing shrubs for cover and food for game. Graves received plant donations from various ladies and from the Royal Society Gardens (*The Mercury*, 25 January 1868, p. 2). Of the animals acclimatised on Green Island, hares were the most successful but not always free from attack, as was the case when two young hares were 'smashed away' by scoundrels in 1871 (*The Mercury*, 27 January 1876, p. 2). By 1875 hares had become so numerous that some had to be removed to Bruny Island and the Tasmanian mainland (*The Mercury*, 1 September 1875, p. 2). It is not clear what other kind of acclimatisation occurred on Green Island until its lease for other purposes in 1886 (*The Mercury*, 23 July 1886, p. 4). Noting in 1900 that hares had not been seen on Green Island 'for many years', the *Daily Telegraph* opposed 'reserving islands and locking up large areas of land to gratify the fads of a number of natural history enthusiasts, unless someone is placed in charge of the animals and birds that it is the wish of some to see multiply and thrive' (*Daily Telegraph*, 11 August 1900, p. 3).

Slopen Island

Another small island used for acclimatisation was Slopen Island in Frederick Henry Bay, which consisted of about 450 acres and had been previously used for penal purposes (*The Mercury*, 27 October 1869, p. 3). In October 1869 Graves and other members of the TAS released one pair of emus, two brace of English pheasants and one pair of laughing jackasses called 'snake-killers' (kookaburra). Graves was impressed with the potential of Slopen Island and in April 1870 enquired whether the government would lease it on the same basis as Green Island (*The Mercury*, 24 May 1873, p. 2). While not agreeing to lease Slopen Island, the Minister of Lands and Works Henry Butler allowed the TAS, with Dr Officer, Graves and Allport as Trustees, to 'continue to occupy the Island' for acclimatisation purposes.

Various animals were let loose on Slopen Island, including hares, deer, rabbits, brown quail and two hen pheasants of 'the ring-necked breed' donated by Governor Charles Du Cane (*The Mercury*, 21 May 1870, p. 2, 14 June 1870, p. 2, 7 February 1871, p. 2, 15 June 1871, p. 3, 8 April 1875, p. 3). The Trustees remained motivated 'to preserve from utter extermination what remains of our Native Game from the strike of the domestic cat, and the destructive hand of the white man' (*The Mercury*, 20 April 1872, p. 1). That turned out to be difficult as in 1872 hares and pheasants were shot and the cover for brown quail was set on fire. Graves placed an advertisement in the press advising that under the *Prison Act 1868* anyone who trespassed on Slopen Island without a licence from the Governor would be fined £100. As with the other islands, the use of Slopen Island for acclimatisation declined after Graves' death and in 1878 lots were leased for other purposes (*The Mercury*, 24 April 1878, p. 2).

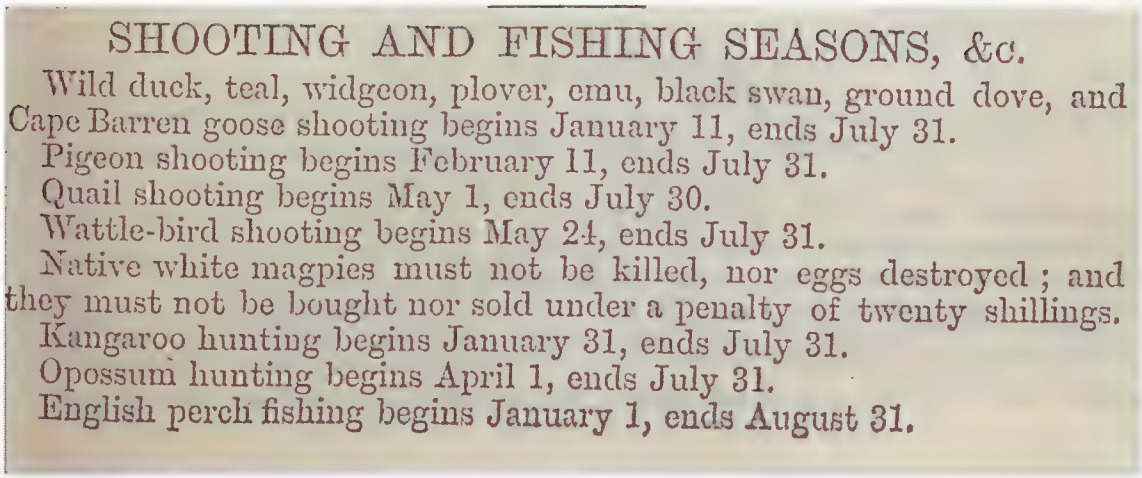
Huon Island

Other Tasmanian islands were also used for acclimatising purposes in the 1880s. Following the example set by his brother John Woodcock Graves, in 1887 the owner of Huon Island Joseph Graves, a Southport timber miller, allowed thirteen Californian quail sent from New Zealand to Edward J. Freeman to be released there (*The Mercury*, 3 June 1889, p. 2). The Californian quail joined many brown quail on Huon Island, which was leased on the condition that cats and shooting were prohibited. The intention was to allow the quail to breed in peace and distribute them to estate owners around Tasmania who were willing to protect, as Freeman put it, 'these handsome little strangers' for future 'sporting men' (*The Mercury*, 14 January 1892, p. 2).

Although acclimatisation was mostly confined to southern Tasmania, some individuals in northern Tasmania showed interest in acclimatisation. Pre-eminent from September 1873 until at least December 1882 was the Northern Fish and Game Protection Society, which worked to protect and propagate mainly fish and some game in northern Tasmania (*Cornwall Chronicle*, 6 October 1873, p. 5, *The Tasmanian*, 9 December 1882, p. 1367). How much contact occurred between Graves and the Northern Fish and Game Society cannot be ascertained with any certainty from available records.

SPECIES ACCLIMATISATION

The following is a summary of other animal species including bird species acclimatisation on mainland Tasmania that occurred after 1862 by the TAS and individual acclimatisers. Those other animals proposed, but not proceeded with or proceeded with and failed are excluded. The bird species to be discussed are those used as game (i.e., pheasant, partridge and quail) or for their songs and ability to control pests



SHOOTING AND FISHING SEASONS, &c.

Wild duck, teal, widgeon, plover, emu, black swan, ground dove, and Cape Barren goose shooting begins January 11, ends July 31.
Pigeon shooting begins February 11, ends July 31.
Quail shooting begins May 1, ends July 30.
Wattle-bird shooting begins May 24, ends July 31.
Native white magpies must not be killed, nor eggs destroyed ; and they must not be bought nor sold under a penalty of twenty shillings.
Kangaroo hunting begins January 31, ends July 31.
Opossum hunting begins April 1, ends July 31.
English perch fishing begins January 1, ends August 31.

Plate 3 – Shooting seasons in Tasmania 1887 (Walch's Tasmanian Almanac 1887, p. 197).

(sparrow and starlings) and those mammals used for game (rabbit, hare and deer). The conclusion outlines some of the more trenchant criticisms of acclimatisation but shows that acclimatisation was far from discredited in the 1890s when it undertook a renewal.

BIRDS

For game

Acclimatisation of game birds had occurred periodically since early settlement. From the 1860s the introduction of game birds like pheasant and partridge became a common acclimatising practice, but they needed protection from shooters (pl. 3). Representing the TAS in the Police Office, Hobart, Graves laid an 'information' against a fellow TAS member William Carter for consuming an imported pheasant in his New Town house on 7 May 1862 (*The Advertiser*, 16 June 1862, p. 2). Carter's young grandson claimed to have shot the pheasant, which had strayed into the family garden by mistake and Carter sought to have the prosecution dismissed as 'frivolous'. Graves pointed out that only twenty-five pheasants had so far been imported to Tasmania at 'much trouble' and if the case was dismissed 'no other information could be laid for like offences' in future. Carter was found guilty and fined £1, not the highest fine of £5 that Graves sought. Graves knew it would be an uphill battle to stop the killing of imported birds. In 1863 Graves noted that over the past four years he had placed pheasants on Huon and Partridge islands and in Salvator Rosa Glen in West Hobart 'at considerable expense' for acclimatisation purposes, but they had 'always been shot by whalers or thoughtless boys' (*The Advertiser*, 17 August 1863, p. 3).

While from the 1860s individual acclimatisers favoured pheasants and partridges, quail was another popular bird species (*The Mercury*, 29 June 1864, p. 2, 24 March 1866, p. 2, 3 December 1869, 2, 17 March 1875, p. 2, *Launceston Examiner*, 20 January 1882, p. 2). For example, in 1869 esteemed ornithologist William Vincent Legge stationed with the British Army in Ceylon sent Graves as Honorary Secretary of the TAS, six males and nine females of the black breasted bustard quail (*Coturnix coromandelica*) (*The Mercury*, 30 October 1869, p. 3). Legge described these small birds as 'one of the best eating of all the quail' and very popular in India. They gave 'good sport' and thrived in 'heathery, sandy land, near the shore, of which there is a good deal' on the East Coast of Tasmania.

Ornithologist Frank Mervyn Littler noted that in the 1870s pheasants were released at New Town and were soon killed by 'pot-hunters' (*The Mercury*, 21 June 1899, p. 1). At *Entally* estate near Hadspen, pheasants thrived for a while with some ninety young birds recorded, but despite being 'under the care of an experienced English gamekeeper', they were shot or taken by 'vermin'. Pheasants and partridges introduced by Sir Richard Dry on his *Quamby* estate were also killed. Littler judged that the main disadvantage of acclimatising game birds was 'the want of sufficient cover'.

Despite the disadvantages, some colonists persevered with imported game birds for shooting. One of the few women to feature prominently in acclimatisation was Scottish-born Mrs. Mary Isabella Cameron, who managed the family property *Kelvin Grove* at Conara after her husband Donald died in 1890 (Cameron 1969, p. 337). In December 1895 Mary had forty young pheasants hatched on *Kelvin Grove* and her recently introduced partridges had begun to lay eggs (*The Mercury*, 25 December 1895, p. 2). She had plans to acclimatise woodcock and grouse, a sign that the fire of acclimatisation was still burning in the minds of some farmers.

For song and pest control

One of the earliest recorded introductions of English birds occurred in 1827 when Captain Langdon brought a shipment of dogs and birds, including blackbirds, and a pair of blackbirds and a thrush were introduced by John Muston in December 1834 (*Hobart Town Courier*, 9 January 1835, p. 2). From the 1860s those colonists who had 'a lingering love of home' and who had 'a taste for the beauties of animated nature' welcomed the introduction of various English songbirds, most prominently house sparrows and starlings, which found the climate amenable to acclimatising

and others less prominent, namely, skylarks, goldfinches and linnets (*The Mercury*, 4 November 1862, p. 4, 4 May 1868, p. 2, 21 June 1899, p. 1).

In June 1867 Graves and 'other friends of acclimatisation' successfully introduced fifteen English sparrows into Hobart and they became 'quite common in many parts of town', especially favouring the Queen's Domain (*Tasmanian Times*, 3 March 1868, p. 2, *The Mercury*, 21 November 1871, p. 3). The sparrows had been sent as a gift by the ASV (*The Mercury*, 4 May 1868, p. 2, Andrew & Griffith 2016, p. 7). Not all acclimatisers had supported the introduction of sparrows. At first an opponent, Morton Allport changed his mind after observing the sparrow driving away the native white eye (silvereye *Zosterops lateralis*), 'a most destructive bird of fruit' (*The Mercury*, 16 March 1870, p. 3). Admitting they had 'good' and 'bad' qualities, Graves in turn defended the white eyes for benefiting farms and gardens by 'destroying noxious insects.'

Others also took a balanced view of introduced birds like sparrows. In 1874 'H' reported that sparrows were 'very numerous' and were 'found in nearly every shrubbery in and near' Hobart (*The Mercury*, 21 November 1874, p. 1). 'H' liked to hear the 'merry chirp' of sparrows and 'their familiar, friendly way of picking crumbs from the windowsill and doorsteps' and 'gladly' spared 'a few ripe cherries for the sake of old home associations'. By 1899 Littler noted approvingly that sparrows appeared 'to eat enormous quantities of the aphis blight off rose bushes and other plants' but stressed that they did 'enormous' damage to grain crops and, despite the best efforts of farmers, very few parts of Tasmania were 'free' from their depredations (*The Mercury*, 21 June 1899, p. 1, Littler 1901, pp. 121–122).

In 1879 a Select Committee on the codling moth recommended that starlings be imported to stop this fruit pest from growing (House of Assembly Journal 1878, Paper 141, p. 4). In 1880 Select Committee Chairman, Dr Edward Crowther, intended to move that Parliament vote £25 to introduce English or New Zealand starlings to Tasmania to stop codling moth from destroying orchards (*Launceston Examiner*, 21 August 1880, p. 2, *The Mercury*, 27 August 1880, p. 3). While the *Launceston Examiner* agreed that it would be advantageous to introduce starlings, it did not think that Parliament should be asked to do the work of an acclimatisation society. Ultimately, Crowther withdrew his motion after a New Zealand visitor Edward McGlashan advised that starlings could be purchased cheaply from the Otago Acclimatisation Society.

In January 1881 the Otago Acclimatisation Society sent 100 starlings to Crowther and all except one arrived alive, but within forty-eight hours of arrival a quarter died or were 'so weak that recovery was hopeless' (*The Mercury*, 27 January 1881, p. 2, 2 February 1881, p. 3). If protected, Crowther believed that this 'best of all English insect finding birds will be thoroughly acclimatised within two years' and earwigs and 'other troublesome insects' will no longer be pests. Crowther gifted several starlings to the Launceston Municipal Council. Although they 'occasionally' ate fruit, the *Launceston Examiner* (21 February 1882, p. 2) attested to their value to gardeners and agriculturists in eating their 'staple diet' of worms, insects and larvae. The *Launceston Examiner* hoped that this 'useful species' would not fall victim to the 'pernicious habit' of country men of killing 'any strange bird which may make its appearance'. It advised citizens to visit the Town Park zoological collection and note their 'appearance and plumage' so they would 'recognize the starling if seen at liberty'.

As evidence of the bird's value, section 3 of the *Game Protection Act 1887* included a penalty of 20 shillings for anyone who shot, willfully killed, or captured a starling and fifty other named birds. Protected by law, the starlings flourished before 1900 and as predicted did 'an enormous amount of good by destroying countless numbers of these pernicious insect larvae' (*The Mercury*, 21 June 1899, p. 1). But in the fruit season their 'depredations' in orchards caused such a 'nuisance' that they were caught and 'frequently used instead of pigeons at shooting matches'.

MAMMALS

Rabbits and foxes

The importation of rabbits occurred in the 1820s well before the first phase of acclimatisation took off in the 1860s. As well as Betsey Island, rabbits were introduced by individuals

Plate 4 –Teenage girl holding a rabbit, Sorell Area 1896. Open Access Libraries Tasmania, Item Number NS1553-1-47.

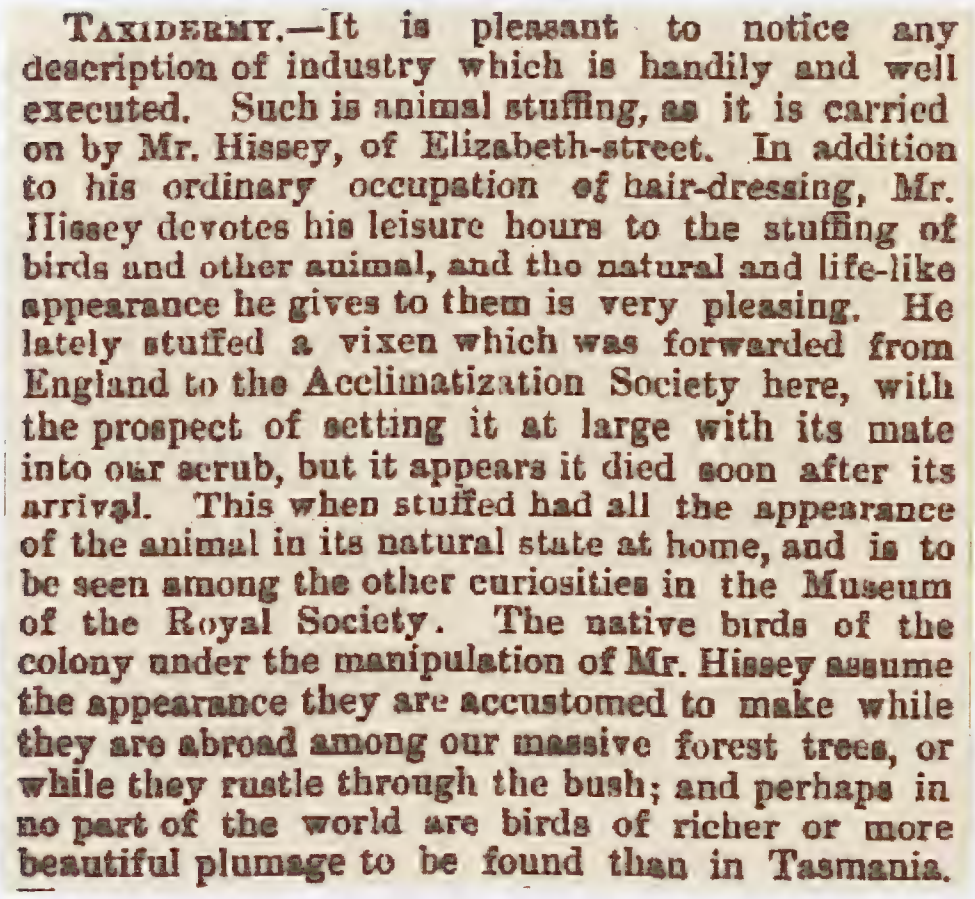
on their properties for hunting or by businessmen (*Colonial Times and Tasmanian Advertiser*, 20 April 1827, p. 1). At first numbers on mainland Tasmania were kept down by 'native cats' (eastern quoll *Dasyurus viverrinus*), but the rabbit population grew in number quickly after an epidemic killed many native cats (*The Mercury*, 17 April 1880, p. 3). In 1827 the *Colonial Times* and *Tasmanian Advertiser* (11 May 1827, p. 4) claimed 'the common rabbit' was 'becoming so numerous throughout the Colony that they are running about on some large estates in thousands' (pl. 4). By 1871 farmers like John Bisdee, a well-known acclimatiser, were at their wit's end as rabbits were ruining farms and he found that lacing crushed oats with the Jacop Hulle brand of strychnine killed 'many thousands' of rabbits (Bisdee 1871, pp. 46–8) as well as numerous other native species.

Another strategy adopted by some farmers was to import animals that might have the capacity to contain the rabbit population. One was the red fox *Vulpes vulpes* which, wrote the *Tasmanian Times* (1 July 1868, p. 2), also 'affords healthy exercise and a noble pastime to the lovers of the chase, and develops amongst them a very high order of intrepidity, and many other truly masculine qualities'. It also 'yields remunerative employment to hosts of industrious adherents of the stable'. Despite these advantages, the *Tasmanian Times* advocated 'less barbarous and more useful modes' of keeping rabbit numbers down. While the Tasmanian bush afforded 'native game and fair sport there is no excuse' for introducing an animal of 'the predatory or "varmint" class' (*Tasmanian Times*, 11 January 1869, p. 3).

That obsessive acclimatiser John Woodcock Graves disagreed. In 1867, in what he called 'my own adventure', he had purchased three foxes from a sailor and released them in the bush, where one died of poison at Southport Narrows in 1870 (*Tasmanian Times*, 31 January 1870, p. 3). Graves hoped that 'the progeny of his vixens may some day arouse a spirit-stirring hark of tally-ho … somewhere amongst the silent crags and cliffs of grand old Mt. Wellington' (pl. 5). This prompted a response from 'An Old Goose' in the satirical newspaper *Tasmanian Punch* (12 February 1870, p. 4). He demanded to be protected against those seeking 'to gratify some morbid and corrupt taste' by introducing 'the thieving, blood-thirsty fox': 'What is the use of acclimatising partridges, pheasants, quails, hares or any other species of small but useful beings' if the fox was acclimatised too? When Graves stood for the Legislative Council seat of Pembroke in March 1870, the *Tasmanian Times* (14 March 1870, p. 2) adduced his attempt at fox acclimatisation in the Huon as a reason for electors not to vote for him.

In September 1871, Captain Harmsworth of the ship *Ethel* brought a number of English bird and animal species, including four foxes to abate 'the rabbit nuisance' (*The Mercury*, 23 September 1871, p. 3). This displeased sheep owners, who feared that foxes would favour their

Plate 5 – The Midland Hunt Club assembled with hounds outside the Melton Mowbray Hotel on 22 June 1907. Source: Archives Office of Tasmania ADRI: PH30-1-9304



TAXIDERMY.—It is pleasant to notice any description of industry which is handily and well executed. Such is animal stuffing, as it is carried on by Mr. Hissey, of Elizabeth-street. In addition to his ordinary occupation of hair-dressing, Mr. Hissey devotes his leisure hours to the stuffing of birds and other animal, and the natural and life-like appearance he gives to them is very pleasing. He lately stuffed a vixen which was forwarded from England to the Acclimatization Society here, with the prospect of setting it at large with its mate into our scrub, but it appears it died soon after its arrival. This when stuffed had all the appearance of the animal in its natural state at home, and is to be seen among the other curiosities in the Museum of the Royal Society. The native birds of the colony under the manipulation of Mr. Hissey assume the appearance they are accustomed to make while they are abroad among our massive forest trees, or while they rustle through the bush; and perhaps in no part of the world are birds of richer or more beautiful plumage to be found than in Tasmania.

Plate 6 – Taxidermied fox reported in *The Tasmanian Times* 20 May 1868, p. 2.

sheep over the rabbits. The sheep owners made 'strong representations' to Harmsworth, who destroyed the foxes by throwing them overboard into the river. Three died but one escaped. Graves offered a reward for the capture of the fox, which was caught by a group of boys a week later (*The Mercury*, 28 September 1871, p. 2). Graves took the fox to his home *Caldew*, where he placed it in 'a secure habitation' and 'under restraint'.

Individual sightings and anecdotal evidence of hunting club interest aside, no hard evidence can be found to indicate that foxes were acclimatised in Tasmania for killing rabbits or for foxhunting (*The Mercury*, 16 August 1877, p. 2, Obendorf 2010, pl. 6). Some farmers preferred weasels and ferrets as predators of rabbits, but like foxes no statistics on how many were imported can be traced. This was due to section 8 of the *Native Game Act 1868*, which fined anyone caught liberating any weasel, ferret or domestic cat £5 for each animal released. In September 1875 'a very large specimen of common ferret' was killed at Sorell, but very few reports of ferrets at large appeared in newspapers (*The Mercury*, 14 September 1875, p. 2).

Not everyone was opposed to ferrets and foxes. When the consolidated *Game Protection Bill 1878* was debated in the Legislative Council, Dr William Lodewyk Crowther took exception to clause 24 that anyone who released a weasel, ferret or domestic cat would be penalised £5 (*The Mercury*, 30 October 1878, p. 3). Arguing that ferrets were 'very useful in destroying rabbits', his motion to expunge the clause was successful. Crowther also took exception to clause 25, which penalised anyone who released a fox, wolf, wild dog or dingo £50 because, contended Crowther, a fox was 'a destroyer of rabbits, and besides provided good sport'. He succeeded in having the clause as relating to foxes expunged too. Colonial Secretary William Moore opposed Crowther's motion, arguing that foxes were 'very destructive to poultry' and more broadly questioned why 'all the nuisances of the mother country were being exported into the colony'. Maclanachan added that foxes destroyed sheep and lambs. In a divided Legislative Council, Crowther's motion was passed six votes to five.

But the dangers posed by releasing the animals listed in clauses 24 and 25 outweighed the reasons for allowing their release. In April 1879 the House of Assembly disagreed with the amendments to those clauses and the Legislative Council did not insist on its amendments (House of Assembly Votes and Proceedings 1878–79, pp. 198–199). The penalties against foxes did not necessarily deter them. For example, around July 1892 a fox was captured in the Evandale district (*Coastal News and North Western Advertiser*, 3 August 1892, p. 2). To assuage curiosity, some foxes were kept in the zoo at Launceston's People's Park in cages located between the Tasmanian devils and leopards, which prompted a visitor to condemn 'the early authorities in their unwise zeal in the direction of pest acclimatisation'

but offer praise for drawing the line at foxes (*Launceston Examiner*, 19 November 1887, p. 2).

Hares

The problems caused by rabbits did not stop the acclimatisation of hares, known for their character and whose stamina and speed pleased crowds watching the popular sport of coursing (Rolls 1984, pp. 345, 353, Minard 2019, pp. 38–40). But they were also known as agricultural pests and this caused conflict with farmers, who suffered crop damage. As noted earlier, the TAS acclimatised hares on various islands. Individuals also attempted to introduce hares to Tasmania, but not all survived the voyage from England. In March 1868 John Murdoch of Lansdowne Crescent returned from England with nine hares and looked after them with great care. The hares remained 'well and in good condition' but when the sailors celebrated New Year's Eve by 'beating drums and blowing horns' the hares 'died of sheer terror occasioned by the unwonted uproar' (*The Mercury*, 18 March 1868, p. 2).

As the hares lived in nests on open ground and not burrows, they were susceptible to attack and needed to be bred in an isolated location. In 1873 Graves arranged with John Chipman, the owner of Droughty Point on Hobart's Eastern Shore, to release four Victorian hares there, where they would be protected by the settlers from being mistaken as rabbits and shot (*The Mercury*, 31 March 1873, p. 2, 19 September 1873, p. 2). *The Mercury* (17 January 1874, p. 2) thought that this 'tongue of land' was unsurpassed for breeding and preserving hares. In the next two years more Melbourne hares were let free on Chipman's estate to Graves' 'great trouble and expense' (*The Mercury*, 14 October 1873, p. 2, 17 January 1874, p. 2, 13 March 1875, p. 2, 1 May 1876, p. 3).

A curious event that revealed Graves' motives for acclimatising hares occurred on 1 April 1876 when Graves' greyhounds killed two hares and he shot another on Droughty Point resulting in his prosecution for breaching section 2 of the *Protection of Imported Game Act 1865* (*The Mercury*, 1 May 1876, p. 3). Graves told the Clarence Police Court that he had 'a perfect right' to kill the hares as he had 'imported them and turned them out on that spot'. Moreover, Chipman had permitted him to enter his land for the purpose of 'coursing' as he had an ill friend who asked for hare soup. The Magistrate, Warden Henry Lamb, pointed out that the section allowed only the owner of the land who had bred and released the hares to kill them. Graves then pleaded guilty and said that he had only wanted a ruling from the Bench on the section. He was fined 1s. but Lamb intimated that similar infringements would incur the full penalty of £20.

The Mercury was infuriated by Graves' action, which showed that he had no right to be the TAS Secretary 'if his object is merely to introduce English game that he and his friends may kill it' for their own 'gratification' (*The Mercury*, 1 May 1876, p. 2). That begged the question why else Graves wanted to acclimatise hares and why hares were otherwise needed in Tasmania. As Graves was noted for breeding coursing dogs, perhaps the hares were introduced to give his dogs an opportunity to show, noted the *Tribune* (23 July 1878, p. 2), that greyhounds were 'not only ornamental, but useful'. In 1878, coursing held on Chipman's estate generated much enthusiasm from coursers and spectators alike.

Farmers were not so enthusiastic when hare numbers grew so large that crops and fruit trees were ravaged and, in some cases, 'an entire field' was destroyed (*Tribune*, 1 August 1879, p. 2). One 'Poor Farmer' claimed that 'wherever they go they leave a desert behind them' (*The Mercury*, 29 April 1879, p. 3). In October 1879 a petition from Glenorchy farmers to the Legislative Council accused hares of 'barking the young trees and destroying the fruit buds within their reach' (Legislative Council Journal 1879, Paper 62). The petition claimed that, as hares were 'very wary and difficult to catch', they no longer needed protection. Unless action was taken immediately, hares would become 'as great a bane to the farmer as the rabbit is now'. The petitioners sought deletion of section 8 of the *Game Protection Act 1879*, which protected hares for eight months of the year and inflicted 'a great injustice and heavy loss on the farmer'.

Persuaded by the petition and realising that hares were becoming a problem around the state, the Crowther Government felt the deletion was justified in the 'interests' of fruit-growing, 'a staple article of export' on which so many depended for their subsistence (*The Mercury*, 22 October 1879, p. 3). The government proposed to remove the section on killing hares between 1 August and 31 March each year. Standing up for large landowners, Ouse farmer Walter Angus Bethune Gellibrand, MLC Derwent, defended the hares and put all the blame on rabbits. If the amendment was passed, he predicted 'indiscriminate slaughter' of hares. Despite objections, the *Game Protection Amendment Bill 1879* was passed. The amendment seemed to increase the popularity of coursing in northern Tasmania. In September 1883, 1,200 people attended Tasmania's 'first enclosed coursing meeting at Mowbray racecourse, where twenty-five of the twenty-eight courses resulted in the killing of the hares (*The Tasmanian*, 8 September 1883, p. 7). Such slaughter drew the condemnation of the Launceston Society for the Prevention of Cruelty to Animals, which also openly attacked hunting animals like deer (Petrow 2015, pp. 172–173).

Deer

Different varieties of deer were imported quite early in Van Diemen's Land 'for their aesthetic value and for mounted hunting' (Minard 2019, p. 98). Around 1829–1830 Indian spotted deer were introduced at Longford and Kempton (Sharland 1963, p. 70). One of the earliest acclimatisers of fallow deer was John Bisdee senior of *Hutton Park*, Melton Mowbray (pl. 7). In 1834 he imported the first fallow deer into Van Diemen's Land and as numbers increased, he would gift one to 'a friend for a hunt in some part of the country' (McAulay nd, p. 19). Periodically deer would escape from *Hutton Park* and become wild animals,

A DEER HUNT AT MELTON MOWBRAY WITH THE GLEN FERN HARRIERS.

At the Melton stock sale, held at that place on Thursday last, I heard that the above named pack were to meet on Saturday. I was determined to be present if possible; so on Friday evening I mounted my steed and proceeded in the direction of Green Ponds, intending to sojourn there for the night, as I reside about 16 miles from Melton, and I thought it would be too hard on my hunter to go that distance, and then hunt. I arrived in the township about half-past 7, and put up at that well-known hostelry, the Wilmot Arms, at which place I passed an exceedingly comfortable night, and should recommend anyone travelling that way to follow my example.

Plate 7 – The Deer Hunt reported in *The Mercury*, 8 Aug. 1876, p. 6.

especially in the Midland districts, where they were hunted by the *Hutton Park* beagles. By 1863 the deer population was estimated to be between 600 and 800, but this was probably an underestimate (Rolls 1984, p. 376, Bentley 1998, p. 134). The introduction of deer to Tasmania continued to be dominated by individuals, but the TAS did play a minor role.

Tasmanian deer were sent to other acclimatisation societies. John Bisdee junior followed in his father's footsteps and was one of few farmers to own 'comparatively tame' deer, six of which he sent to the Queensland Acclimatisation Society in February 1865 (*The Mercury*, 15 February 1865, p. 2, *Launceston Examiner*, 8 April 1865, p. 2). In 1867 the TAS gave a deer buck held by Graves to the Invercargill Acclimatisation Society (*The Mercury*, 2 September 1867, p. 2). Graves also had under his care three does and a buck purchased from Bisdee by Robert Quayle Kermode, a member of the TAS who sent them to the Acclimatisation Society of Otago on the condition that their money value be given to the TAS (*The Mercury*, 26 September 1867, p. 2).

In the early 1850s the Lieutenant-Governor Sir William Denison imported from India five or six fallow deer that he later sent to the Tasman Peninsula, where they 'greatly' increased in numbers under the watchful eye of the Commandant of Port Arthur, James Boyd, also a member of the Royal Society of Tasmania and an enthusiastic acclimatiser (*The Mercury*, 14 August 1862, p. 3, 27 September 1867, p. 2). Although they were 'very shy and cunning', in 1868 two fine buck deer were caught and the Governor, Thomas Gore Browne, gave them to the TAS (*The Mercury*, 25 September 1868, p. 2). One buck went to the estate of William Emmanuel Baynton at Huntingfield near Kingston, 'where several does had been at large for a considerable time past'. The other buck would be kept at *Caldew* until 'a mate can be procured for him' and then both would be released 'on the extensive plains of Southport'. The society hoped to obtain more deer from the Tasman Peninsula and 'distribute this noble and useful creature over the vast waste land of the colony'. Bisdee helped by donating two hinds to the TAS to mate with 'the full antlered buck' (*Tasmanian Times*, 14 October 1868, p. 2).

By the late 1860s deer, 'almost as thick as kangaroo in our mountains', were 'stalked by sportsmen as thoroughly acclimatised and legitimate game' (*Tasmanian Times*, 16 June 1868, p. 2). As deer were 'chiefly browsers, almost any number may be fed without any serious injury to sheep and other grass-eating animals'. Deer were still being sent from more exotic climes. In 1869 Legge sent Graves three fine elk and a spotted deer from Colombo (*The Mercury*, 30 October 1869, p. 3, 3 December 1869, p. 3). Legge hoped his gift would 'rouse' the TAS 'into activity' because Tasmania was 'such a magnificent country for acclimatisation purposes'. Legge thought Tasmania could be 'a sort of Scotland, a favourite resort for sportsmen' if the right game was sent there.

Graves proposed that the elk should be placed in a government-funded Acclimatisation Nursery in a location 'at all times easily and pleasantly accessible to the citizens, as an object of public interest, and a source of healthful enjoyment' (*The Mercury*, 24 December 1869, p. 2). *The Mercury* (24 December 1869, p. 2) thought the most suitable site was the Domain quarry (later the Beaumaris Zoo site) near Government House, which could be turned into a Game Nursery Reserve for foreign and native game as had been established in other colonies. Tasmania needed new fauna, not just 'to provide for our table new luxuries', but also to 'serve educational uses of no mean order': 'The Ministry of Nature in its display of the wonders of its handicraft', taught 'reverential admiration of the skill of the creative hand, and of tenderness to the creatures

in whose wonderful constructive economy that skill, and the benevolence accompanying it, have been displayed'.

No government support for a game nursery was forthcoming. The elk seemed to have been moved from Rosny estate to John Lord's *Richmond Park*, where they settled 'naturally and contentedly', and one was placed on Slopen Island (*Launceston Examiner*, 12 May 1871, p. 5, *The Mercury*, 26 February 1870, p. 3, 19 May 1870, p. 3, 2 June 1871, p. 2). In March 1870 Legge sent three more spotted deer, two females and one male to Slopen Island. Another doe elk would be sent to mate with the 'solitary monarch' on Slopen Island, but the 'solitary monarch' swam back to mainland Tasmania and made his home on the local pastures. Although in July 1871 the first elk born in Tasmania died after its birth at *Richmond Park*, the future of deer in Tasmania was assured (*The Mercury*, 10 August 1871, p. 4). Buck hunting, wrote *The Mercury* (17 July 1872, p. 2), had undoubtedly become 'one of the legitimate amusements of the many visitors who visit our shores year after year'.

CHANGING ATTITUDES

At various points in this paper, we have seen that the problems associated with acclimatisation of different animals including birds had often been raised, despite Edward Wilson's claim that acclimatisation was a 'very great idea'. Even some acclimatisers held decided reservations about aspects of acclimatisation, which historian Harriet Ritvo (2012, p. 412) describes as 'a kind of Pandora's box'. Morton Allport expressed concerns in private correspondence as early as 1864. One concern was how domestic cats, rabbits and rats forced native marsupials to be 'driven off their grounds' (Allport Collection 1864b). Another concern was the 'ludicrous' and 'mischievous' suggestion by William Thomas Owen, Honorary Secretary of the Wellington Acclimatisation Society, that the migratory snipe be acclimatised in New Zealand. Allport wondered how they were to be 'caught, fed and transplanted and what he meant to do with them'. He was even more damning of a recent attempt to ship foxes to Tasmania. Luckily, they all died on the voyage out, but he could not think of a 'more truly mischievous importation', only 'equaled by the willful introduction of the Scotch thistle'. He was similarly unflattering about sending native animals like kangaroos, wombats, bandicoots and laughing jackasses to Europe, 'a wild species of Idiocy which it would be hopeless to try to cure'.

In his 1867 paper delivered to the Royal Society of Tasmania, Allport traded contempt for critical analysis. He contended that it took 'so slight a change in the natural balance of creatures to settle the question of presence or absence of particular forms of life' (Allport 1867, p. 11). Those interested in acclimatisation should 'study well the natural history and capabilities of the countries to which they wish to introduce new creatures' before they spent 'much time or much money in their experiments'. In places where 'indigenous creatures' had been extirpated, Allport did see a positive role for acclimatisation in 'introducing and protecting animals of similar habits to those driven out'. Otherwise, he was convinced 'the successful establishment of new creatures can only be accomplished at the expense of those already in possession of the ground'. That was justified only if the new animals were 'better worth having than those already existing'. The same rule held true for new vegetables and plants. On one point at least Allport should have taken his own advice. Harrison (1997, p. 56) notes that in 1858 Allport contributed to a 'disastrous ecological impact' by acclimatising European carp in the rivers of southern Australia.

A visceral and class-based criticism came from Louisa Anne Meredith, guiding light of the Society for the Prevention of Cruelty to Animals and from 1881 an Honorary member of the Royal Society of Tasmania, who in 1887 denounced acclimatisation as 'at best but a presumptuous experiment, quite as often mischievous as successful' (Petrow 2015, pp. 165–170, *The Mercury*, 2 August 1887, p. 3). Overwrought by the untold number of rabbits killed by phosphorous poisoning, she condemned the small number of 'wealthy, educated, influential men, who call themselves Christians too', who killed, 'by means which torture by lingering agony, intense beyond the power of words to describe' (*The Mercury*, 2 August 1887, p. 3). They killed, 'not a solitary individual but … millions of poor little beasts, not placed in these lands by their Creator, but which were introduced by men for their own diversion and benefits'. This 'positive evil' was 'the natural result of ignorant human interference with the all-wise designs of God'.

Meredith acknowledged that introducing rabbits was a 'serious mistake', which required 'many methods' to be 'adopted for their destruction' (*The Mercury*, 2 August 1887, p. 3). Some methods involved 'short suffering' and left the bodies and skins 'fit to be utilised for human food and profitable manufactures'. But the 'legalised brutality' of phosphorous poisoning was 'a gigantic sin', which dealt 'wholesale destruction to every living thing within reach of it'. For example, it exterminated 'our insectivorous birds—those God-given protectors of agricultural and gardening industries'. She blamed 'large landholders', the 'wool kings', 'offenders against religion and morality', for using poisoning to protect their sheep runs and making themselves 'lords of wastes and princes of deserts' at the expense of small tenants, 'the retributive result of which avarice comes in the shape of rabbits'. If small tenant farmers had remained on the land, 'the rabbit pest' would have disappeared 'before the guns and traps of men and boys, and the cooking and eating of the families generally'.

Noting the failures of acclimatisation in New Zealand, America and Tasmania, *The Mercury* (23 July 1890, p. 2) drew the lesson that 'whenever we seek to interfere with the wise provisions of Dame Nature, we only display how woefully ignorant we are of the result that is likely to flow from our action'. One commentator called 'Tasmanian', writing in the *Tasmanian News* (17 December 1890, p. 3), cited many examples of deleterious acclimatisation and declaimed 'Oh! acclimatisation what evil has been wrought to Tasmania in thy name!'.

Some commentators did not oppose the idea of acclimatisation, but its unthinking practice. Railing against 'Indiscreet acclimatisation', the *Launceston Examiner* (16 March 1892, p. 2) advocated placing acclimatisation under the 'control' of a government department, which would make 'proper and diligent enquiries … to prevent that which had proved to be a pest in other lands being firmly established in our own'. Authoritative bird expert Legge, author of *The Birds of Ceylon* and a 'strenuous' acclimatiser, advised in 1895 that before any animal or bird was introduced into a new country the following questions should be asked 'Is the climate suitable, is the food taken by the species existent in the country, and will any harm result from the proposed introduction?' (*The Mercury*, 20 May 1895, p. 4). That last and most difficult question was impossible to answer for the trial-and-error acclimatisers with rudimentary scientific knowledge, but if they had taken the precautions suggested by Legge they would have saved Tasmania much agricultural and ecological damage.

Despite the problems caused by acclimatising foreign species and its ambiguous successes, acclimatisation was not itself driven off by its critics. Rather, in the 1890s, acclimatisation found a second wind, but in different circumstances from the 1860s and with a renewed emphasis on game protection, a sign of greater appreciation of native wildlife. This was illustrated with the formation in the Royal Society's room of the Game Protection and Acclimatisation Society in April 1895 (*The Mercury*, 3 April 1895, p. 3, Jenkins 1977, pp. 92–93). At the May meeting talk soon turned to familiar topics such as the introduction of the New Zealand Paradise duck and the English wood pigeon, partridge and pheasant, but the main aim of the new society was to prevent 'really beautiful', 'harmless' native birds from becoming 'extinct' (*The Mercury*, 11 May 1895, p. 3, 27 May 1895, p. 3). But, unlike the 1860s, in the 1890s the acclimatisation-mania spread to parts of Tasmania outside of Hobart with the formation in March 1899 of the Acclimatisation Society of Northern Tasmania and in September 1899 of the West Coast Acclimatisation Society, which intended to introduce fish and songbirds (*Launceston Examiner*, 29 March 1899, p. 4, *Zeehan and Dundas Herald*, 29 September 1899, p. 3).

Curator and Secretary of the Tasmanian Museum and Botanical Gardens, Alexander Morton attended the September meeting and offered his assistance (*Zeehan and Dundas Herald*, 29 September 1899, p. 3). In this new phase of the acclimatisation experiment, Morton advised the West Coasters 'to be careful what birds they introduced, as trouble might be caused in the future if a variety like the sparrow got too plentiful'. He suggested that they should contact Legge, 'the greatest authority on ornithology in the Australian colonies'. This sage advice showed that something had been learned since 1860, but faith in acclimatisation's much-vaunted benefits resurged stronger than ever in the 1890s.

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LIMING AGRICULTURAL SOILS IN TASMANIA, AUSTRALIA, FROM 1940 TO 2020: ACIDITY OF THE SOILS AND THE SOURCES, PRODUCTION, QUALITY CONTROL, TRANSPORT AND CURRENT PATTERNS OF LIME USE

by Barry A Rowe

(with six figures, seven tables and one appendix)

Rowe, BA (2023). Liming agricultural soils in Tasmania, Australia, from 1940 to 2020: acidity of the soils and the sources, production, quality control, transport and current patterns of lime use. *Papers and Proceedings of the Royal Society of Tasmania* 157: 59–80. ISSN: 0080-4703. Tasmanian Institute of Agriculture, University of Tasmania, Box 3523, Burnie, TAS 7320, Australia. Email: barry.rowe@utas.edu.au

Production and sources of agricultural limestone and dolomite in Tasmania are considered in the context of their geology, the acidity of their surface soils, transport and current patterns of use. The Tasmanian Government paid a rail freight subsidy between 1940 and 1980 to encourage on-farm use of ground lime products. Regulations and registration were adopted in 1955 to ensure minimum standards for neutralising value and particle size. Registration ceased in 2005 when the regulations were changed to align with other Australian states.

The production of ground agricultural liming materials increased from 4 kt in 1940 to 75 kt at the time the transport subsidy ceased in 1980. Subsequently, annual production continued to gradually increase to a peak of 207 kt in 2001, but then declined to an average of 145 kt between 2006 and 2020. Current lime use is substantially in excess of the amount required to neutralise the acidifying effects of nitrogen fertilisers. The evolution in the methods of quarrying, transport, costs and quality control between 1940 and 2020 are reviewed.

Key Words: Aglime, limestone, dolomite, lime sand, dissolution, acidification, transport subsidies.

INTRODUCTION

This paper details the production and roles liming materials have played in Tasmanian agriculture in the 80 years from the beginning of World War II in 1940 until the Covid-19 pandemic in 2020. Production of agricultural liming materials was about 4 kt/year in 1940 before gradually increasing to 207 kt/year in 2001, before declining to about 145 kt/year from 2006 to 2020. Liming was essential in developing land on very acid (pH_w <4.8) swamp (Organosols) and heathland (Podosols) in far northwest Tasmania, King Island (Stephens & Hosking 1932), Flinders Island (Dimmock 1957) and along the northeast coast (Stephens & Cane 1938, Hubble 1946, Kjar & Wilson 1948) for soldier settler schemes, particularly between 1940 and 1982. Between 1940 and 1970 liming was vital in rejuvenating the productivity of Krasnozems (Ferrosols) as well as the Lateritic podzolics (Kurosols) in the Northern Midlands. These soils had been degraded by sheet erosion and nutrient exhaustion caused by intensive cropping practices that resulted in declining crop yields and poor to non-existent clover growth (Stephens 1937, Stephens *et al.* 1942, Loveday & Farquhar 1958, Kjar 1960, Tilt 1971). After 1960, expansion of the area sown to 'improved' clover-based pastures together with crops such as peas (*Pisum sativum*), beans (*Phaeseolus vulgaris*), onions (*Allium cepa*), carrots (*Daucus carota*) and oil seed poppies (*Papaver somniferum*) that required target soil pH values of 5.5 to 6.0 for optimum production resulted in an increasing demand for liming. In the case of poppies, production expanded from traditional cropping areas in the northwest into the northeast, the Northern Midlands and Derwent and Coal River valleys.

This paper provides a brief overview of the acidity of Tasmania's agricultural soils and geology of its liming materials. It reviews historical changes in the sources, production, transport, and dissolution of ground agricultural limestone and dolomite, as well as their quality control and current pattern of use.

BRIEF OVERVIEW OF TASMANIAN AGRICULTURE

Tasmania, including King and Flinders islands in Bass Strait, lies south of mainland Australia between latitudes 40.0° and 43.5° S.

A broad map of land use in Tasmania is shown in figure 1. Agricultural land constitutes about 28% of the 68,400 km^2 of the state, Forestry (24%), and the remaining area (48%) is committed to nature conservation, protected areas and minimal use (ABARES 2021).

Tasmania has a cool temperate climate with the average annual rainfall (AAR) distribution shown in figure 2. The high rainfall areas in the west and north (AAR >800 mm) are winter dominant and rainfall increases with altitude. The eastern part of the state is drier (AAR <800 mm) with a uniform monthly rainfall distribution. It lies in a rain shadow caused by the west coast mountains which protect it from the predominant westerly rainfall.

Tasmania experiences four seasons with summer being dry and warm with evapotranspiration exceeding rainfall every year for periods of 2–5 months depending on annual rainfall: lower rainfall areas usually have longer summer dry periods and more variable monthly rainfall. A broad

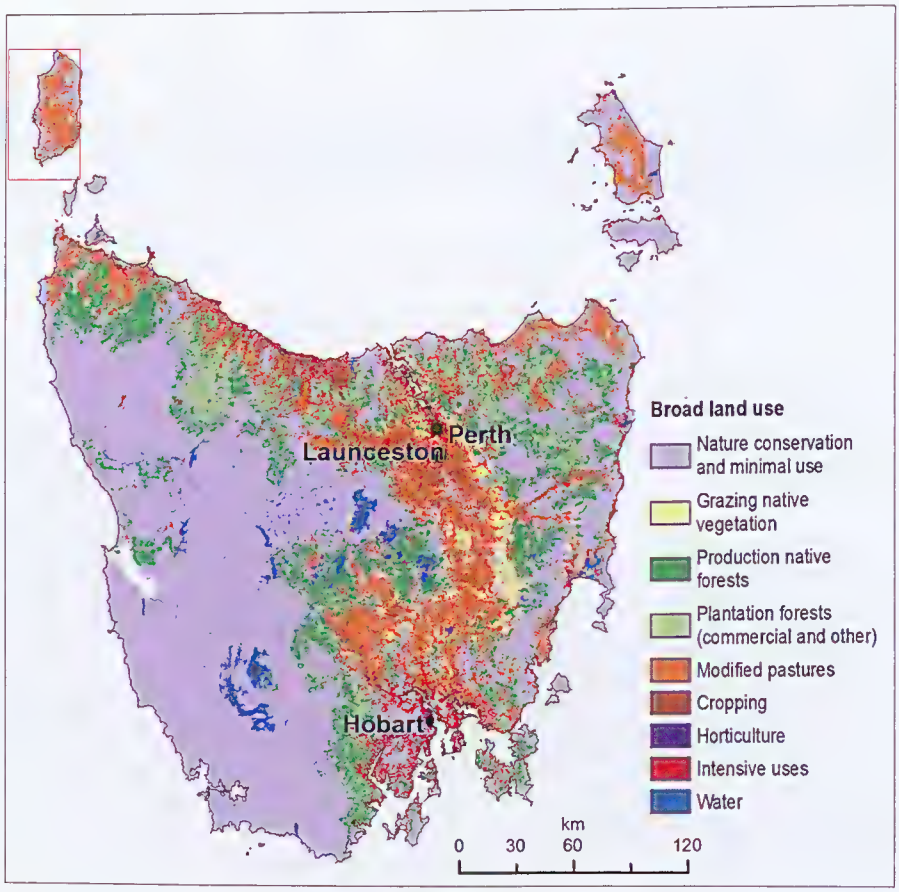


FIGURE 1 – Land use in Tasmania (ABARES 2021)

overview of agricultural land use in Tasmania and the Bass Strait islands overlain with AAR isohyets is shown in figure 3. The latter map is adapted from Colour Maps 2 (Langford 1965) and Map 10 (Scott 1965) in the Atlas of Tasmania (Davies 1965). The continuous black lines show the approximate boundaries between the Cradle Coast, and the Northern and Southern Natural Resource Management (NRM) regions.

The area of agricultural land use has not increased markedly since this map was produced in 1965. However, land used for cropping has both increased and intensified with increasing use of supplementary irrigation. Notwithstanding this, the area used for cropping and perennial horticulture remains less than 4% of the total area of agricultural land, 53% is used for grazing modified pastures and the remaining 43% is used for grazing natural vegetation (Cotching *et al.* 2009).

A generalised soil map of Tasmania (Nicolls & Dimmock 1965) using 12 mapping units based on the Great Soil Group classification (Stephens 1962) is shown in figure 4. This soil map was chosen primarily because the associated soil descriptions (Nicolls & Dimmock 1965) provide baseline information on soil acidity, AAR and production issues at the beginning of the review period when only minor amounts of agricultural lime had been applied (fig. 6).

The approximate relation of these mapping units to the dominant soil orders as described in the more recent Australian Soil Classification (Isbell 2002) are shown in parentheses. The distribution of the dominant soil orders in Tasmania (Cotching *et al.* 2009) was constructed using Tasmanian land system surveys and the best available soil information. A coloured map of the distribution is available at https://maps.thelist.tas.gov.au/listmap/app/list/map?bookmarkId=910666.

Surface pH of the agricultural soils when measured in a suspension of soil in water at a ratio of 1:5 (pH_w), range from very acid (pH_w <4.8) on swamp and heathland soils (Organosols and Podosols) to moderately acid (pH 5.0–6.2) on Krasnozems (Ferrosols) and Lateritic podzolics (Kurosols). In contrast, Black Earths (Vertisols) Prairie Soils (Dermosols) and Brown Earths (Chromosols, Dermosols) were slightly acid to neutral at the surface. Very minor areas of alkaline calcareous soil (Rudosols) occurred on the west coasts of King and Flinders islands and northern Tasmania (Nicolls & Dimmock 1965).

Swamp (Organosols) and Heathland soils (Podosols) of the far northwest and northeast coasts, and Bass Strait islands

The swamp soils are high in organic matter. They occur primarily in far northwest Tasmania, on Montagu Swamp near Togari and Mowbray Swamp west of Smithton. Minor areas also occur in the northern parts of both King and Flinders islands. These soils are very acid (pH_w <4.8) and mostly in a rainfall area receiving an AAR 800–1,000 mm.

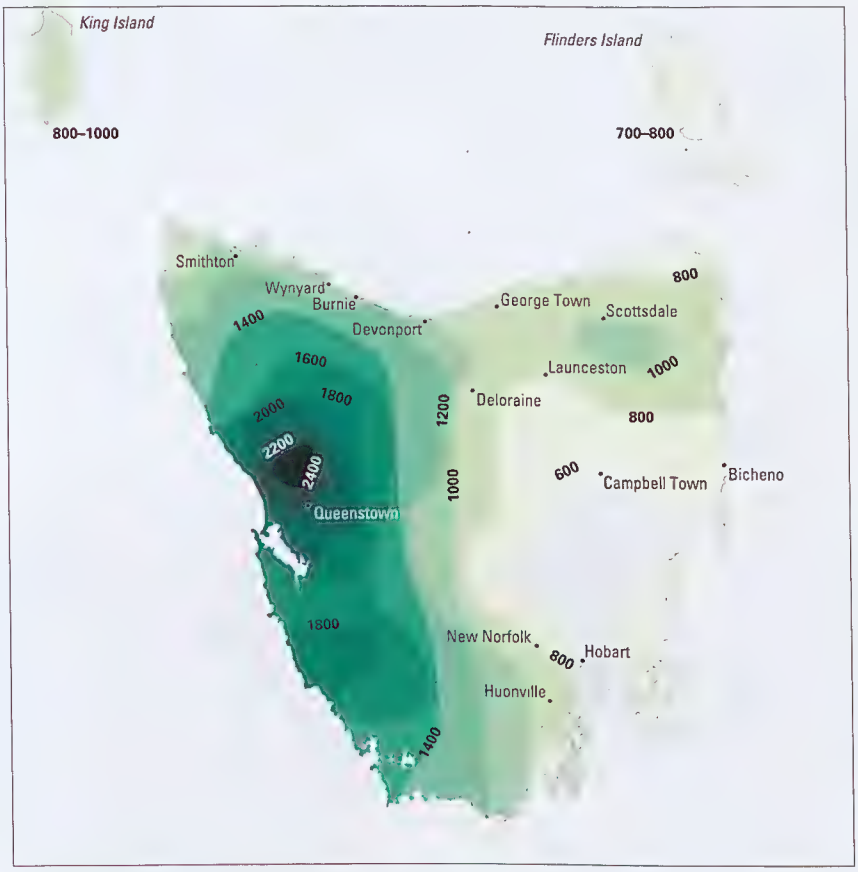


FIGURE 2 – Average annual rainfall distribution in Tasmania

The heathland soils are typically course-textured soils developed on marine and aeolian deposits in coastal areas. They occur primarily in far northwest Tasmania and King Island (AAR 800–1,000 mm), northeast Tasmania and on Flinders Island (AAR 700–800 mm). In their natural state the surface of these soils was very acid (pH_w ≤4.8). Most of these soils were cleared of native vegetation, drained and sown to clover-based pastures (Fleming 1943) on land developed for soldier settlement schemes.

The selection of a strain of *Rhizobium trifolii* (TA1) in 1953 from a Podosol near Bridport in northeast Tasmania was crucial to the development of these soils since it was effective on subterranean clover (*Trifolium subterranean*) and better than the available strains on white clover (*T. repens*). Inoculation of legume seeds with this strain, together with heavy rates of agricultural limestone or dolomite (2.5 t/ha^{-1}), ensured nodulation and growth of these *T.* spp. (Paton 1957, 1960). Depending on rainfall, these pastures have been used for dairying, beef and wool production.

Krasnozems (Ferrosols)

These soils developed on Tertiary basalts in both northwest and northeast Tasmania and are the most important agricultural soils for cropping. Ferrosols from Smithton to Deloraine in northwest Tasmania were mapped by Stephens (1937). Within this area, a detailed map of the Burnie–Table Cape area together with a more detailed transect from Doctors Rocks near Wynyard to beyond Henrietta has been produced (Loveday & Farquhar 1958).

Krasnozems are used for intensive vegetable cropping and pastures that are grazed for dairying and also for beef and fat lamb production. Vegetable and milk processing plants have been located in close proximity to the Krasnozems at coastal towns and cities at Smithton, Wynyard, Burnie, Ulverstone and Devonport in the northwest and, prior to the end of 2003 (Priestley & Goss 2004), at Scottsdale and Winnaleah district in the northeast. The importance of these soils is highlighted by the establishment of government-operated research farms at Elliott in 1950 (Chapman & Nicholson 1975), Forthside in 1963 (Frappell & Forbes 1976) and Tewkesbury in 1933 (Chapman & te Strake 1977).

The Krasnozems are divided into red and brown suborders. The distribution of Krasnozems and decline in soil pH associated with increasing rainfall and altitude is summarised (Cotching 2015). The red soils, known locally as *Burnie clay loam* (Loveday & Farquhar 1958), occur at altitudes with an AAR below 1,000 mm. Their pH_w is ≥ 6.0 in the A horizon and usually increases to pH_w 6.3–6.6 deeper in the profile (Stephens 1937). The brown soils have been divided into three groups based on colour and rainfall (Loveday & Farquhar 1958). They are known locally as *Lapoinya clay loam* (AAR 1,000–1,250 mm), *Yolla clay loam* (AAR 1,250–1,500 mm) and *Oonah clay loam* (AAR >1,500 mm). In contrast to the red suborder, the

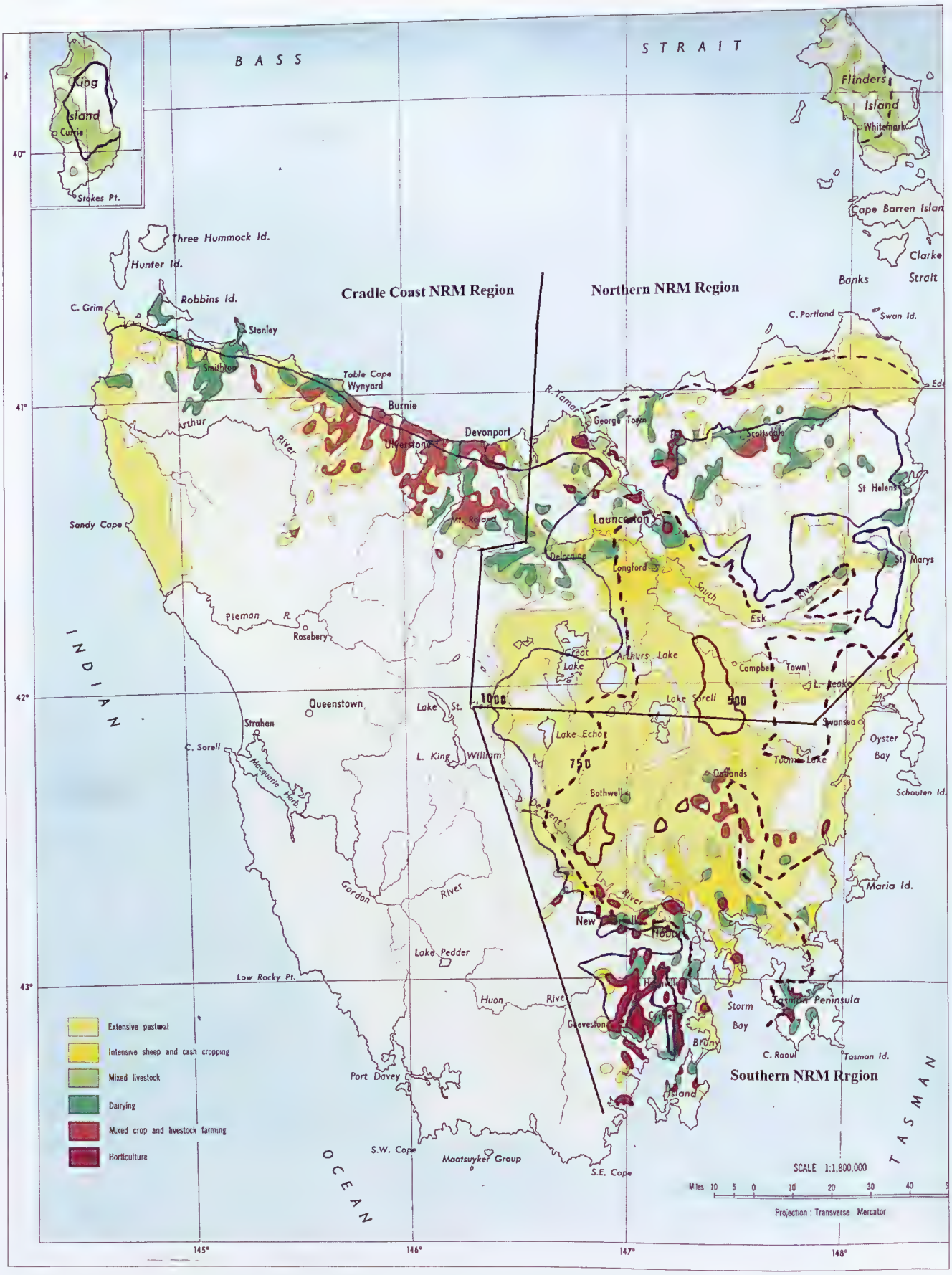
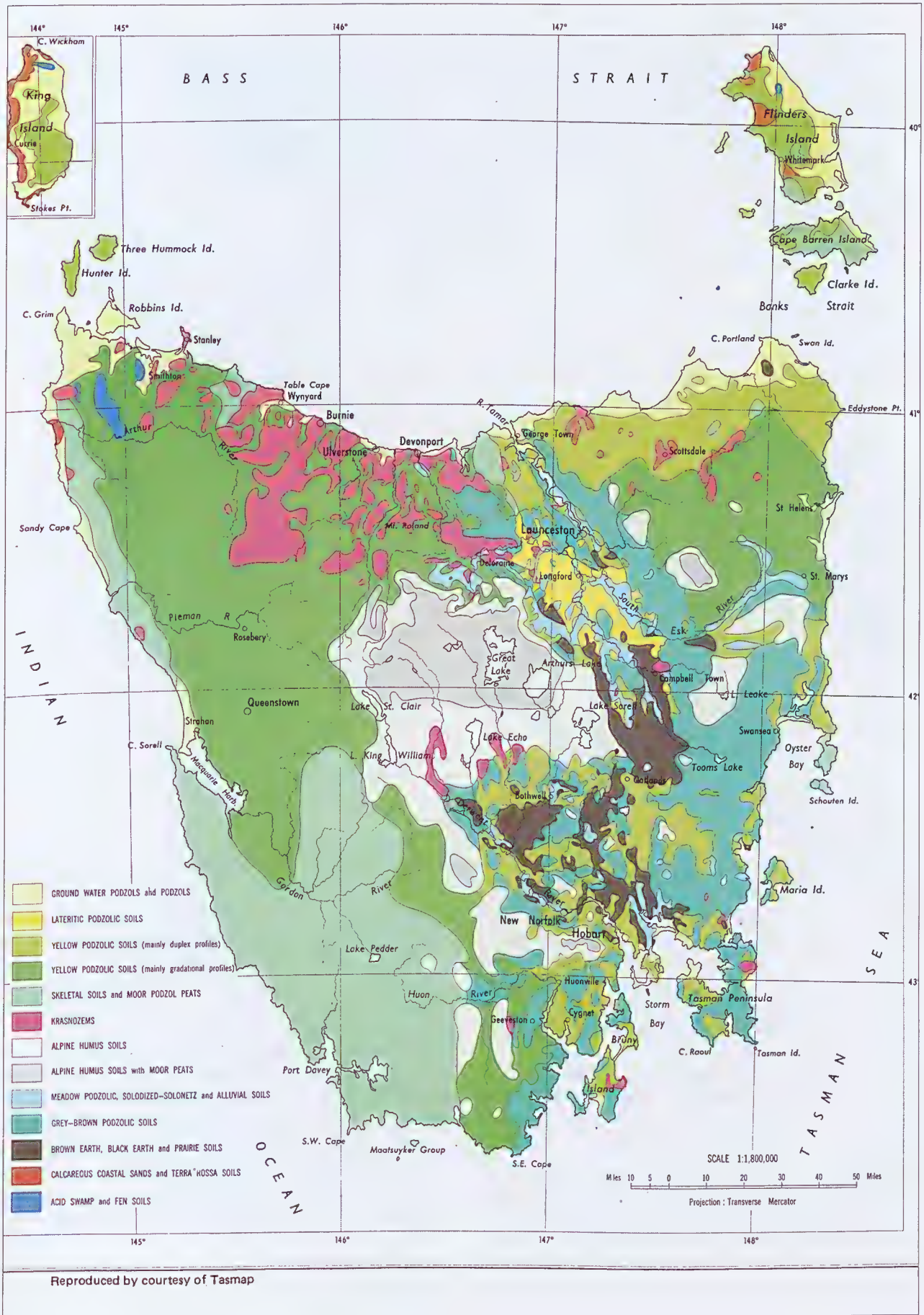


FIGURE 3 – Tasmanian agricultural land use overlain with average annual rainfall isohyets (500 mm = continuous red line; 750 mm = dotted red line; and 1,000 mm = continuous blue line). The uncoloured areas (76%) are used for forestry, nature conservation, protected areas or minimal use. The continuous black lines show the approximate boundaries between the Cradle Coast, and the Northern and Southern Natural Resource Management regions.



Reproduced by courtesy of Tasmap

FIGURE 4 – The soils of Tasmania and their distribution

A-horizon of these Ferrosols was lower than the red soils (pH_w 5.5–6.0) and decreased with profile depth, often to pH_w 4.9–5.0. Consequently, sheet erosion further lowers surface pH in these soils (Stephens 1937).

All the Krasnozems had concretions of manganese at depths between 40 and 90 cm (Stephens 1937). Severe soil erosion increased the prevalence of manganese concretions (18.8% Mn) in the surface 0–150 mm of the soil profile with a concurrent reduction in pH_w to about 4.9. and manganese toxicity in Brassicas (Lamp 1965).

Lateritic podzolics (Kurosols)

Lateritic podzolic soils developed on soft tertiary sediments in the northern part of the Midlands Graben (Davies 1965) located on the extensive inland plain between Launceston and Tunbridge in the Northern Midlands. These soils had been used for dryland cereal growing, pulse crops and grazing. They fall into two groups having either sandy or loamy A-horizons. Both are slightly to strongly acid. The former occupy the almost flat remnants of old erosion surfaces and high river terraces. The sandy A-horizons contain large amounts of ironstone gravel and rest sharply on deep, brightly coloured and strongly weathered kaolonitic clay. The AAR ranges from 700–800 mm.

The decline of cereal crop production and poor growth of subterranean clover on many of these soils warranted the establishment of the Cressy Research Station by the Tasmanian Government in 1937 (Anon. 1940, Clark 1976). An outstation at Green Rises in 1974 was established to service the Cressy Longford Irrigation Scheme (Clark 1976).

Yellow podzolic soils (Kurosols)

The yellow podzolic soils with duplex profiles occur on King Island (AAR 800–1,000 mm) and Flinders Island (AAR 700–800 mm) and in the Northern and Southern Midlands (AAR 500–800 mm). They also occur in the Tamar and Huon valleys and on the Tasman Peninsula. These soils are strongly acid throughout the profile. Grazing is the predominant land use on both modified pastures and natural vegetation but these soils are the second most used soil order for cropping (Cotching *et al.* 2009). These soils have been used to grow apples and other pome fruits and more recently for growing cherries and/or vineyards.

Brown Earths (Chromosols, Dermosols), Black Earths (Vertisols) and Prairie Soils (Dermosols)

These soils are characteristic of basalt and dolerite in the relatively dry valleys of the Southern Midlands and southeast with mean annual rainfall <635 mm. They also extend into the southern part of the Northern Midlands. They are generally slightly acid to neutral at the surface and neutral to alkaline below. It is not uncommon for Black Earths and some Brown Earths to have appreciable amounts of free carbonate deeper in the profile although this feature has been mostly lost from the Prairie Soils (Nicolls & Dimmock 1965). Due to the low AAR, these soils are primarily used for grazing although cereal cropping and small areas of perennial tree crops and vegetable seed crops are grown where supplementary irrigation is available.

THE GEOLOGY OF TASMANIAN LIMING MATERIALS

Tasmania has abundant sources of calcareous materials including Ordovician, Permian and Tertiary limestones, and calcareous lime sands. These are complemented by calcium-magnesium liming materials including Precambrian dolomites and dolomitic sands (Hughes 1957). Limestones that are crushed for agricultural purposes are predominantly Ordovician in origin and occur west of a line drawn between George Town in the north and Southport in the south (fig. 5). Permian limestones lie almost exclusively east of this line. The latter are usually of lower and more variable quality although Permian limestone from Maria Island (MIL) was of sufficient quality for cement making and was briefly a source of agricultural limestone in early 1950 (Hughes 1957).

Tertiary limestones are not extensive. They occur on King and Flinders islands and close to Bass Strait in far northwest Tasmania but have rarely been used for agricultural purposes (Hughes 1957). Pulbeena lime sand is a Quaternary travertine deposit (Summons 1979), whereas, coastal lime sands on the west coasts of far northwest Tasmania, and King and Flinders islands are of recent origin (Pleistocene) (Hughes 1957). Precambrian dolomites occur west of the Georgetown/Southport line (fig. 5) (Spry 1957). Roger River dolomitic lime sand is of unspecified origin.

Sources of Tasmanian agricultural liming materials

Figure 5 shows the location of all sites where registered agricultural liming materials have been obtained in relation to Tasmania's railway system, which was the main lime transport system prior to 1980. They are named for location and product (e.g., Smithton Dolomite - SD). Table 1 lists the sites and characteristics of agricultural liming materials registered in Tasmania in 1985 plus some details for one quarry that closed in 1968 (Melrose) and two new dolomite quarries that opened since 1994.

All these quarries produce material of metallurgical grade with neutralising values of crushed limestones ranging from 88–97% and crushed dolomites ranging from 102–104% (tab. 1). These materials are suitable for producing cement, calcium carbide, steel, ferromanganese, aluminium, zinc, paper-making and aggregate for concrete and road-making. In practice, production of metallurgical liming materials underpins the viability and relatively low cost of Tasmanian agricultural liming materials.

Particle sizes of Tasmania's crushed limestones are mostly <2 mm with 7–34% of particles in the 1–2 mm size range (tab. 1). These agricultural limestones are substantially coarser than the crushed calcitic limestones from NSW and Victoria that had <5% in the 1–2 mm size range (Conyers

Figure 5 – Sources of agricultural liming materials located on a map of Tasmania's railway network. The North–South line demarcates the separation between the Ordovician and Permian limestones. Precambrian dolomites also occur to the west of this line.

et al. 1996). Similarly, crushed dolomites from NSW and Victoria are finer with about 75% being <0.25 mm (Conyers *et al.* 1996) compared to Tasmanian dolomites that have 39–49% in this range. In the case of Smithton Dolomite about 8% of particles are in the 2.00–3.2 mm range.

Ordovician limestones

High-grade limestone of the Gordon formation outcrops in northern Tasmania at Melrose (Eugenana), Gunns Plains, Railton, Mole Creek and Flowery Gully, and at Lune River in the south. Its neutralising value (NV %) or calcium carbonate equivalent (CCE %) is high (88–96%). The rock ranges in colour from dark blue at Melrose, to blue-grey at Railton, creamy white at Mole Creek and a range of colours from black, grey, light-grey and off-white at Flowery Gully. Frequently, the rock has narrow white veins of calcite containing up to 2% of magnesium carbonate (Hughes 1957).

Stone from the various quarries listed below produce/produced limestone that was chemically very similar and consistent (tab. 1).

Melrose quarry at Eugenana (ML) (1940–1968)

The Broken Hill Pty Company mined and shipped metallurgical grade limestone to Newcastle for use as a flux in iron smelting from 1916 to 1947. Melrose Agricultural Lime began grinding waste screenings for agricultural limestone in 1940 and in 1948 they took over the quarries and part of the plant. In 1948 they produced 10 kt/yrar of agricultural limestone and 14 kt/year in 1955. Thereafter,

TABLE 1 – Bulk Tasmanian agricultural liming materials, their source, years of production and indicative values for calcium (Ca %), magnesium (Mg %), neutralising value (NV) and percentage of each particle size range (mm) (adapted from Stackhouse (1985)

Materials	Source	Years of production	Ca %	Mg %	NV %	LOI[1]	Particle sizes (mm)				
							3.2–2.0	2.0–1.0	1.0–0.5	0.5–0.25	<0.25
Limestone	Melrose (ML)[2]	1940–1968	33.9	tr.	90	39.6	–	–	–	–	–
	Railton (RL)	1949–1997	35.8	0.7	88	–	0.4	20.8	24.3	15.1	39.6
	Mole Creek (MCL)	1973–2020[6]	37.5	0.7	96	42.5	0.4	20.4	23.0	19.8	36.4
	Flowery Gully (FGFL)[3]	1948–2020[6]	36.1	1.1	94	–	1.4	6.9	11.2	16.1	64.4
	Lune River (LRL)	1979–1994	37.0	0.7	97	42.4	0.2	34.2	27.4	14.3	23.9
Dolomite	Smithton (SD)	1952–2020[6]	23.4	13.1	104	45.0	8.2	18.8	22.4	11.0	38.8
	Cressy (CD)	1994–2020[6]	27.6	13.0	104	–	0.0	17.0	20.0	18.0	46.0
	Weld River (WRD)[4]	2015–2020[6]	21.7	11.7	102	–	0.0	8.0	17.0	15.5	59.5
Lime sands	Pulbeena (PL)	1954–1998	30.2	0.7	78	44.4	9.8	15.3	14.9	12.4	37.2
	Roger River (RRDS)	1985–1996	21.4	12.0	95	–	2.4	8.0	11.1	8.9	67.2
	Dune Sand (DS)[5]	1950–2020[6]	30.0	–	75–90	–	0.0	2.9	29.2	49.7	19.0

[1] LOI – Loss on ignition from Hughes (1957); [2] (Fricke 1968); [3] Flowery Gully fine lime; [4] Crezzco (2021); [5] a non-registered liming material ; [6] still operating in 2020; – data not available.

annual production gradually declined, averaging about 1.7 kt/year in the last three years of operation before the quarry was closed at the end of 1968. Registration continued until 1970 while stockpiled material was sold.

Railton Agricultural Lime (RL) (1950–1997)

In 1860, limestone was taken from a small quarry east of the Railton–Latrobe Road, about 1.5 km north of Railton, to produce burnt lime. This continued until the early 1960s after which the plant produced only agricultural limestone. By 1956, most of the limestone was being sourced from Goliath Portland Cement Company (GPC) about 2 km west of the initial quarry. In June 1963, the initial quarry was closed and subsequently all limestone supplies were obtained from the major limestone quarry used for cement making by GPC and owned since 2003 by Cement Australia.

Production gradually increased from about 2 kt in 1952 to around 10 kt in 1963 and over the next six years averaged 21.5 kt before declining to 3.6 kt in 1979. Subsequently, production recovered to about 24 kt/year. By 1995, a market downturn coupled with strong competition from other companies eventually forced this business to close in April 1997. The plant was dismantled, and the land was sold to GPC. Prior to its closure, this business was the primary source of agricultural limestone used in field experiments on pastures, field crops and vegetables by research officers at the Tasmanian Department of Agriculture (DA) and its subsequent incarnations.

Railton Agricultural Lime RL (2002–2020+)

After an interval of about five years a new business with the same name, Railton Agricultural Lime, was setup in Wynyard but continued to use limestone sourced from the Cement Australia quarry in Railton. In early 2021, the Tasmanian Environmental Protection Authority approved an application by Railton Agricultural Lime to quarry from the old Dally's site located about 6 km from Railton (Anon. 2021a) foreshadowing a change of source.

Flowery Gully Limestone (FGL) (1946–2020+)

Flowery Gully deposits were quarried by up to three different lime producers at a time, initially to produce burnt lime and subsequently agricultural and metallurgical limestone.

Beams Brothers (1946–2020+)

Beams Brothers produced burnt lime before commencing to sell agricultural limestone in 1957 after they obtained a contract in 1955 to supply limestone to the aluminium smelter located at nearby Bell Bay.

Beaconsfield Lime Products Ltd (BLP) (1948–1958)

BLP took over a burnt lime quarry operated by Dally's in 1948 and continued to produce burnt lime but also produced ground limestone for agricultural purposes. It

was a relatively small operation quarrying less than 1 kt in the last two years of operation.

Sulzberger (1961–1978)

This operator produced limestone for chemical purposes before commencing to produce agricultural limestone in 1961. However, production using a mobile crushing plant was low and variable (24–760 t/year^{-1}) with an average production of only 175 t/year^{-1} over the last ten years of operation.

Lune River Limestone (LRL) (1979–1994)

Quarries at Lune River in the far south of Tasmania supplied limestone that was transported by sea from Ida Bay. It was used to produce carbide and acetylene black at Electrona and as a flux in metallurgical processes at the Electrolytic Zinc Works in Hobart. Benders Spreading Services took over the quarries in 1979 following closure of the carbide plant. It continued to supply limestone to the zinc works and also produced agricultural limestone until it was closed by the Australian Government in 1994 to protect the nearby Exit Cave system.

Limestone from this source was used in a 50:50 mixture with superphosphate to produce basic superphosphate to increase germination and emergence of turnips when sown mixed with superphosphate (Sherwin 1934). It was also used to protect rhizobia on inoculated legume seeds from the acidity of superphosphate (Paton 1957) and to bulk up very small seeds such as Artemisia (10,000–15,000 seeds/g^{-1}) with a neutral material to ensure an even distribution of seeds when sowing (Ferreira *et al.* 2005).

Mole Creek Limestone (MCL) (1973–2020+)

This quarry opened in 1972 but did not produce agricultural limestone until the following year. It was owned by Mole Creek Limestone Limited (1972–1994), David Mitchell (1994–2002) and Sibelco Australia Pty Ltd (2002–2018). It traded as Unimin, a subsidiary of Sibelco, between 2002 and 2009. In 2018 it was sold to the Canadian company, Graymont. Reserves of limestone have been variously estimated to have the capacity to extend operations for 20–50 years (Anon. 2015, 2019).

Permian Limestones

Maria Island Limestone (MIL) (1951–1955)

Permian Limestones are widespread in the eastern half of the state but are generally of lower neutralising value than Ordovician limestones. Consequently, they have been a very minor source of ground agricultural limestone with material from Maria Island being a notable exception. This source was short-lived due to cost and problems with shipping by sea.

Precambrian Dolomite

Smithton Dolomite (SD) (1955–2020+)

Dolomite (Spry 1957) is quarried and crushed within 2 km of the main street of Smithton for agricultural purposes as well as aggregate for concrete and road-making. It was initially owned by Duck River Dolomite Company before it was taken over by Circular Head Dolomite and Trading Company (CHD). Most agricultural dolomite is sold to properties in the Circular Head region west of Sisters Hills in northwest Tasmania.

Weld River Dolomite (WRD) (2015–2020+)

This quarry is located about 25 km west-northwest of Huonville at Eddy Creek near Lonnavale. It is an area excised from the World Heritage area (WHA) and on exhaustion it will be rehabilitated and returned to the WHA. This dolomite is described by Calver (1989). The particle size distribution of this material (tab. 1) was interpolated from published data (Crezzco 2021) and is currently the only commercial liming source in southern Tasmania.

Permian Dolomite

Cressy Dolomite (CD) (1994–2020+)

The Cressy quarry was established in 1994–1995 by Beams Brothers to produce dolomite for metallurgical and agricultural purposes. Dolomite occurs as an inlier in basal Permian tillite and is not considered to be extensive (Bacon *et al.* 2008).

Lime sands

Pulbeena Lime (PLS) (1954–1998)

Pulbeena lime sands are a Quaternary travertine deposit (Summons 1979). The deposit consists of fine friable calcium carbonate with narrow bands of peat. The material was usually wet because the water table was close to the surface and, as a consequence, it was usually sold on a volume basis. It was applied using specially designed wet spreaders, (Hughes 1957, p. 279). In some cases the material contained so much moisture that it failed to satisfy registration specifications for CaO % and was excluded from registration and the lime transport subsidy.

Produced by Mineral Supplies Pty Ltd (A Pearson & Son) and marketed by Field and Co Pty Ltd of Devonport and subsequently by Wright, Stephenson Pty Ltd. In 1958, Wright, Stephenson Pty Ltd purchased the business, expanded its operations and managed it until about 1984 when it was on-sold to a partnership involving Mr G Dilger and Railton Lime. In 1988–1989, the pit was sold to J House (Irishtown) who continued to operate the pit until about 1997/8 when a combination of prohibitive pumping costs and a rapid decline in lime quality forced its closure.

Annual sales averaged about 5 kt during the first ten years before gradually increasing to 10 kt over the next decade before fluctuating between 10 and 20 kt over the following decade. Production over the last 8–10 years was estimated to be c.7–9 kt/year (GJ Quinn pers. comm.).

Roger River Dolomite Sand (RRDS) (1985–1996)

This small deposit of dolomite sand was operated to a very limited extent until about 1989. Subsequently, Mr House sold about 15 kt over the next six to seven years before the commercially viable resource was depleted.

Dune Sands

Dune Sands composed largely of shell and other marine organism fragments with as much as 90% calcium carbonate occur on the west and south coast of King Island, and west coasts of far northwest Tasmania south of the Arthur River, and on Flinders Island (Nicolls & Dimmock 1965). Neutralising value of these materials is variable (75–90%) (Hughes 1957) but particle sizes are small with more than two-thirds less than 0.5 mm (Rowe BA unpublished). These materials have been widely used on King and Flinders islands particularly during land development.

Burnt lime

Burnt lime (CaO) or quicklime is produced by heating limestone (calcination) to 1000–1300°C. Prior to 1950, there were many small operations producing burnt lime in local areas for construction and agricultural purposes, but these were often short-lived and proved to be uneconomic in the longer term.

Hydrated lime

Hydrated lime $Ca(OH)_2$ often called calcium hydroxide and marketed as Limil® in Tasmania, is a dry powder produced by reacting quicklime (CaO) with sufficient water to satisfy its affinity for water under prevailing conditions. It is used in metallurgy to remove impurities and adjust final chemistry. Highly reactive and soluble lime is essential for pulp and paper manufacturing, water treatment and air quality management. It is also used as a plasticiser in mortar for bricklaying.

In agriculture, Limil® is mixed in a ratio of 15% Limil® to 85% superphosphate to produce reverted superphosphate in an exothermic reaction. Consequently, it needs to be prepared prior to sowing with legume seeds inoculated with rhizobia, otherwise, the heat could kill the bacteria. Furthermore, Limil® is not suitable for coating inoculated legume seeds because its high pH (≈12.5) kills rhizobia (Halpern 1971). Limil® is also reacted with copper sulphate to produce Bordeaux mixture and with sulphur to produce lime sulphur. Reaction products of each have been used as fungicides (Wade 1949).

By-product lime

By-product lime is hydrated lime that has been recovered at the end of industrial processes such as carbide production at Electrona and paper-making (e.g., at the now closed APPM paper-making plant at Burnie). It was broadcast on soils and pastures to increase soil pH_w.

Plastaid®

Plastaid® is a by-product (precipitator dust) from the manufacture of Portland cement using the wet process at Railton. It was marketed by GPC between 1973 and 1990 primarily as an alternative plasticiser to Limil® for mortar in bricklaying because it was inert and did not require protective actions required to handle Limil®. Production was 400 t in 1989–1990 (MRT-AR1989/90) but production ceased shortly after following a change in the cement manufacturing process.

Plastaid® had an average neutralising value of 77% and a high surface area of 1.32 m^2/g^{-1}. Average chemical composition of Plastaid® as supplied by GPC for four samples taken between 1968 and 1989 was 30.8% Ca, 5.0% Si, 2.3% Al, 2.1% Fe, 0.6% S, and 0.8% Mg. Despite its high pH_w (c.11.0), when measured in a 1:5 Plastaid®–water suspension, Plastaid® did not adversely affect survival of rhizobia on coated legume seeds when stored at ambient temperatures of 5.1–19.1°C for at least ten days or 59 days at 10°C. Furthermore, Plastaid®-coated seeds produced effective crown nodules on a range of pasture legumes under field conditions. Consequently, it was first recommended by the DA as a coating material for inoculating and lime pelleting pasture legume seeds in 1973 and it was promoted by GPC in its marketing material. The method for inoculating and lime pelleting pasture legume seeds using Plastaid® has been described (Rowe & Johnson 1985, 1990).

ANNUAL PRODUCTION OF TASMANIAN GROUND AGRICULTURAL LIMESTONE AND DOLOMITE

The annual production of ground agricultural limestone and dolomite is presented for the period 1941–2020 in figure 6. Data for figure 6 were assembled as described in appendix 1. These data include lime sands from Pulbeena but exclude other lime sands and use of burnt lime.

Production of ground agricultural limestone began at Melrose in 1940 using waste screenings, and its distribution by rail was underpinned with a freight subsidy. In 1948, the waste screenings were exhausted and it became necessary to quarry new material at a higher cost. Due to existing price controls, the price of limestone from Melrose was doubled by arbitration (TAHO: AD9/1/9836). This enabled other producers, including Smithton Dolomite, to enter the market and access the rail transport subsidy.

Production of agricultural limestone increased over tenfold in the 50 years from 1951 to 2001 rising from about 15 kt/year to 162 kt/year. Production averaged about 140 kt/year during the following four years to 2005 before averaging about 104 kt/year in the following 15 years until 2020.

Dolomite production ranged from 1 kt to 2.5 kt/year during the first 20 years from 1951–1971, representing about 10% of liming materials. Over the next 20 years to 1991, production increased 15-fold to about 36 kt/year representing about 25% of liming materials. Subsequently, production averaged about 41 kt/year but its percentage of total production increased from 25% to 30% as production of agricultural limestone declined. The relative stability of dolomite production after 1991 may reflect, in part, the opening of new sources of dolomite at Cressy in 1994 and Weld River Dolomite in 2015.

Total production of liming materials trended upwards from 1940 to a peak of 207 kt/year in 2000/01 followed

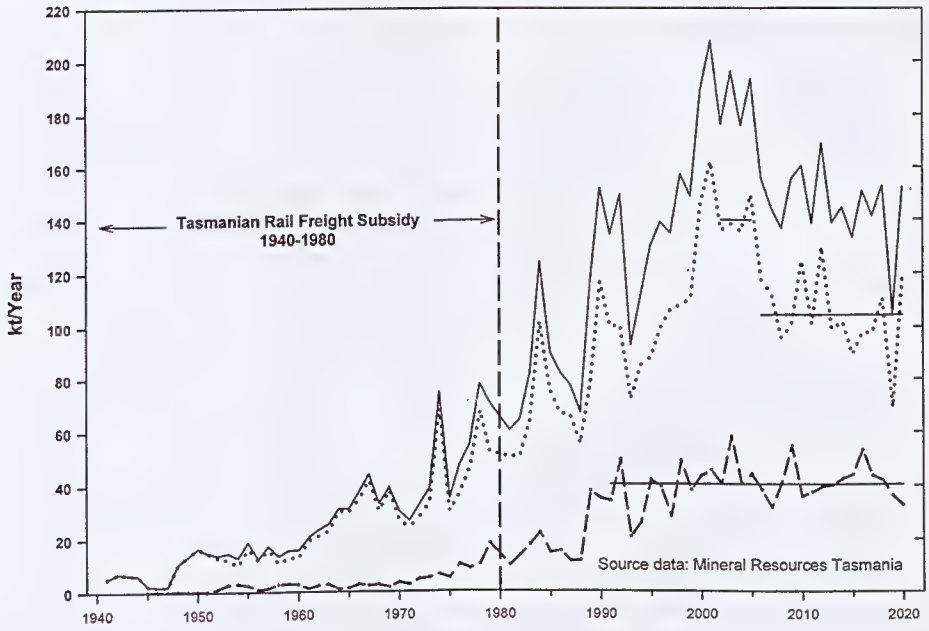


FIGURE 6 – Annual production (1940–2020) of agricultural limestone (dotted line), dolomite (long dash) and total production of agricultural liming materials (continuous line). Average annual limestone production (140 kt/year) for 2002–2005 and (104 kt/year) for 2006–2020 are shown by the horizontal lines on the limestone plot. Average annual dolomite production (41 kt/year) for 2006–2020 is shown by the horizontal line on the dolomite plot.

by a short plateau of 185 kt/year between 2001 and 2005. Thereafter, total production averaged about 145 kt/year between 2006 and 2020, as limestone production declined. Expansion in the production of liming materials up to 2001 was probably driven by an expansion in land used for cropping green peas and beans for freezing and canning, onions, and two new crops: poppies, and pyrethrum. The first commercial poppy crops were sown in 1964 (Frappell 2010) and pyrethrum in 1985 (Fist & Chung 2015).

The area of poppy sowings increased dramatically from 750 ha in 1970 (Frappell 2010) to about 4,000 ha in 1987, before reaching a peak of 20,000 ha between 2000 and 2003. By 2000, the total area of poppies in the state was equal to that sown to potatoes, peas, green beans, onions and pyrethrum combined (Fist 2001). Poppy growing spread from the usual cropping areas in the northwest to the Northern and Southern Midlands, and the river flats in the Coal River and Derwent valleys in the south of the state (Laughlin *et al.* 1998, Fist 2001). The area of poppies increased dramatically between 1987 and 2002/5 This in turn increased the demand for liming since poppies require a pH between 5.7 and 6.0 (Laughlin *et al.* 1998) and contracts to grow poppies depend on soil pH. During this time, production of liming materials increased from 77 kt to a peak of 207 kt/year.

The upward trend in total production of liming materials to 2002 was not disrupted by the closure of limestone producers at Melrose in 1968 or Lune River in 1994, the removal of the superphosphate bounty in 1974, cessation of the rail transport subsidy in 1980 or closure of the wool reserve price scheme in in 1991, all of which might have been expected to have a negative effect on demand. The decline in total production of liming materials after 2005 was associated with a halving in poppies from an initial peak of 20,000 ha in 2002 to an average of 10,000 ha poppies sown between 2004 and 2008. At the same time the acreage of onions declined, and vegetable processing plants closed at Scottsdale at the end of 2003 and Smithton in 2010. The area of poppies nearly tripled to a new peak of 28,500 ha five years later in 2013 but the production of liming materials at 140 kt/year did not approach the peak production of 207 kt/year before the area declined to about 12,000 ha in 2020.

The decline in total production of liming materials was mostly due to the reduced use of agricultural limestone rather than dolomite which remained relatively stable. This may be attributed to the fact that only one of the three sources of dolomite are in proximity to the areas where poppies are grown.

Despite the annual production of agricultural liming materials increasing dramatically between 1940 and 2002/3 to 207 kt/year before stabilising at about 145 kt/year, its use in agriculture is relatively small in comparison to the industrial uses. In 1940 only 5 kt/year of agricultural limestone was produced, whereas, about 300 kt/year was shipped from Melrose to Newcastle, NSW, to be used as a flux in iron production (Hughes 1957). At the peak in the production of agricultural liming materials (limestone plus dolomite) in 2002/03 at 207 kt/year, of which about two-thirds was agricultural limestone at about 142 kt/year, whereas, 120 kt/year limestone was used in chemical and metallurgical processes and more than twelve times as much limestone (1700 kt/year) was used for cement manufacture (Bacon *et al.* 2008).

Transport and spreading of crushed liming materials

The period from 1940 to 2020 saw dramatic changes in the way ground liming products were quarried, transported and spread on farmers' properties. It involved increased levels of mechanisation accompanied by improved efficiency of handling and precision of application. In the 1940s, the quarried rock was often manhandled onto small trucks and delivered to the crushers. Now the stone is loaded mechanically and transported by conveyor belts. In the 1940s and 1950s ground agricultural limestone and dolomite were initially transported around Tasmania in hessian sacks. During the war years (1939–1945) a lack of sacks restricted sales of limestone from Melrose. Each sack was filled with limestone at a rate of 14 to the imperial ton (160 lb = 64 kg), whereas, by the early 1970s, second hand, heavy-duty plastic bags were filled at a rate of 20 to the imperial ton (112 lb = 51 kg). Bags were tied with 'binder twine' before being barrowed to storage sheds, loaded directly onto clients' trucks or a 'Limeworks' truck for delivery to local railway stations where it was consigned to all parts of Tasmania by rail. It was also shipped to King and Flinders islands where it was used in land development under the Soldiers Settlers Program (GJ Quinn pers. comm.). In the mid-1960s it became more common for material to be handled in bulk rather than in sacks, and transport by train gradually declined as branch lines closed and road transport became the preferred mode of transport. Rail transport effectively ceased after rail transport subsidies ceased in 1980.

Transport of bulk material from quarries to rail-siding stockpiles or to farm was organised by merchants or more frequently by farmers using their own trucks or local carriers using small capacity trucks of 10–20 t. The size of trucks has progressively increased until now truckloads of 25-plus tonnes are the norm, and almost 100% of product is transported from the source by road and dumped directly on farm. Bagged material was spread in paddocks using drop spreaders or three-point linkage spinners with a capacity of 2m^3. Subsequently, bulk lime was spread by contractors using specialist spreading machines. Spreader design has evolved from chain drive walking floor type, which did not deliver material accurately, to the latest stainless steel constructed, GPS-guided, computer-managed, hydraulic-powered versions that spread the liming material evenly. These machines are mounted on 4 x 4 or 6 x 4 purpose-designed vehicles with capacities of 4–8 m^3.

Lime transport subsidies

Information in this section has been extracted from Tasmanian Government records held by the Tasmanian Archive and Heritage Office (TAHO).

Beneficial effects of liming have long been recognised but costs were considered to be prohibitive (Hudson 1930) until the Tasmanian Government started subsidising lime transport on Tasmanian Government Railways (TGR). The TGR included all railways shown in figure 5 apart from the Emu Bay Railway between Burnie and Zeehan, the Zeehan–Strahan line and the Ida Bay line in the far south, which were privately owned and serviced mining ventures.

Lime transport subsidies on the TGR were paid for 40 years between 1940 and mid-May 1980 with the dual purpose of increasing the pH of agricultural soils and supporting the extensive rail network of main and branch lines servicing most agricultural districts (fig. 6). Secondary benefits accrued to landholders, lime producers and state and federal governments through royalties and taxes. A little-used subsidy to transport burnt lime was terminated in 1931. Transport

TABLE 2 – Subsidy rates for rail transport of agricultural liming materials measured in 1940 and in 1955

Zone	Nominal distancefrom works[1] (km)	Boundaries based on distance from Melrose 1940	Subsidy Rate 1940[2] shillings/ton	Subsidy Rate 1955[3] shillings/ton
1	<50	West from Melrose (Devonport) to Preolenna junction at Flowerdale and east to Deloraine (Ashley Siding)	Nil	3.0 ($17.59/t^{-1})[4]
2	51–160	West of Flowerdale including Preolenna, Trowutta, Stanley, and the Marrawah tramway to Redpa. East to Western Junction then north to Lilydale and south to Conara Junction	6.0 ($26.06/t^{-1})	23.25 ($40.90/t^{-1})
3	161–240	Lilydale east to Herrick, Conara east to St Marys, Conara south to Parattah	7.5 ($32.58/t^{-1})	26.5 ($46.62/t^{-1})
4	241–320	Parattah south to Hobart, Apsley and Derwent Valley line to Kallista	10.0 ($43.44/t^{-1})	33.5 ($58.93/t^{-1})
5	>320		na	22.0 ($38.70/t^{-1})

[1] Railway stations and sidings are shown in figure 5; [2] TAHO: AD9/1/2690; [3] TAHO: AD9/1/12852; [4] Indicative 2020 value allowing for inflation ($/t^{-1}); na – not applicable.

subsidies (1940–1980) were authorised under section 34 of the *Transport Act 1938* and regulated by the Lime Freight Remission Regulations. These Regulations stipulated that subsidies were payable to any person or company that undertook to transport in excess of 1500 t/year on fully laden rail trucks (7, 14–15, 21 tons) at an ex-works price of 15 shillings/ton^{-1} for agricultural purposes by the primary producer. Subsidies were repayable if the 1,500-ton target was not exceeded.

In practice, and for administrative convenience, the consignor was charged the subsidised transport rate by the TGR/Australian National Railways. The railways were then reimbursed by the DA on receipt of invoices for the cost of the subsidy. The difference between the standard rate and the subsidised rate was also known as the primary producer contribution, particularly after 1961, although in fact the primary producer never made a direct payment (TAHO AD9/3/347). Subsidies were never payable on transport by road or privately owned railway (e.g., Emu Bay Railway). Furthermore, it was not payable on product supplied to produce-merchants or used in fertiliser mixtures (e.g., 50:50 lime superphosphate), stock feeds or in metallurgical/industrial processes. However, a subsidy of 5 shillings/t^{-1} was paid for agricultural limestone shipped on the Tasmanian Transport Commission vessel (*Naracoopa*) from Maria Island to ports on the Tasman Peninsula and in the municipalities south of Hobart from 1952–1955.

1940–1948

In 1940, only Melrose Agricultural Lime Company could supply ground limestone at the maximum ex-works cost of 15 shillings/t^{-1} because it was grinding waste screenings from the quarry at Melrose. BHP had been shipping up to 300 kt/year from this quarry to Newcastle to be used as a flux in steelmaking (Hughes 1957). Initially, subsidy rates were determined for each of four zones depending on the distance from Melrose, midway on the Don to Barrington line (tab. 2, fig. 5).

1948–1955

Melrose agricultural lime company took over the quarries when BHP ceased quarrying at in 1947. This necessitated an arbitrated doubling of the ex-works price to 30 shillings/t^{-1} in 1948 by the Price Commissioner. Subsidy zones and rates remained the same (TAHO: AD9/1/9836). This change provided an opportunity for other sources of agricultural lime to enter the market.

In 1949, the subsidy was extended to AR Blenkhorn Lime Kilns at Railton for carriage of a minimum 1,500 tons of burnt lime and agricultural limestone in total (TAHO: AD9/1/9836). In 1952, subsidies were made payable to Beaconsfield Lime Products Ltd and Duck River Dolomite Company from Smithton (TAHO: AD9/1/11342). In 1954, subsidies were further extended to RK Sulzberger at Flowery Gully and lime sand from Pulbeena (TAHO: AD9/1/12852). Subsidies payable for both Beaconsfield and Flowery Gully lime were calculated for carriage of lime product from Launceston, which was the nearest railhead to these sources at the time. In the case of dolomite from Smithton and lime sand from Pulbeena in far northwest Tasmania, an extra zone (Zone 5) and subsidy rate was set for distances over 320 km (TAHO: AD9/1/12852). In 1955, extension of the subsidy to other sources of agricultural liming materials was based on distance from the sources (zones) but of necessity the boundaries shown in table 2 were varied according to the source.

1955–1961

In 1955, the basis for paying transport subsidies changed fundamentally. Firstly, all lime products to be applied to agricultural soils were carried free of charge (i.e., fully subsidised) on the TGR and the government-owned transport vessel. Secondly, lime products had to be registered under the *Stock Medicines, Fertilisers and Pesticide Act 1950* and associated Regulations 1954. The regulations of 1954 specified minimum standards for CaO and fineness. These arrangements eliminated the need for zones and variable rates of subsidy.

1961–1980

In 1961, a flat rate subsidy was introduced and lime products were again transported at discounted rates. Again the consignor paid TGR the discounted rate and TGR received the subsidy from DA. This arrangement encouraged use of lime products from the closest source.

Rates of subsidy progressively increased between 1961 until subsidies ceased in mid-May 1980 (TAHO: AD9/1/19860): 1961, 1.00 \$/t^{-1}; 1964, 2.00 \$/t^{-1}; 1965, 2.15 \$/t^{-1}; 1967, 3.00 \$/t^{-1}; 1968, 3.30 \$/t^{-1}; 1979, 3.50 \$/t^{-1}.

In 1977–1978, the total subsidy cost to consolidated revenue was \$55,000 (equivalent to \$301,000 in 2019–2020 dollars) and consignors were paying 26% of the total transport cost at \$3.25/t^{-1}. The primary reason for terminating subsidies was the rapid escalation of its cost from \$85,423 in 1978–79 to \$156,415 in 1979–80 (equivalent to an increase from \$432,800 to \$718,500 in 2019/20 \$). This was due, in part, to a rapid and unexpected increase in demand from a few property owners. Added to this, cartage rates increased by 10% and 15% in the two years following the takeover in 1978 of TGR by the Australian National Railways. Furthermore, only a small proportion of farmers were directly benefitting from the subsidy due to the closure of many branch lines (dates listed in fig. 5 (Cooper & Goss 1996)) together with increased use of road transport. Second-level reasons included the distortion of market competition between lime producers, particularly those not on the railways, correction of molybdenum deficiency by direct application of molybdenum rather than using crushed liming products, and lower demand from the drier Midlands where soils were less acid (TAHO: AD9/3/347).

Removal of the subsidy dramatically changed the way liming materials were sold and transported. It meant that the market area for individual lime producers, particularly those located on the rail distribution network, became restricted to areas closer to the source rather than the market area being the whole of Tasmania. This accelerated a move from rail transport to road transport (GJ Quinn pers. comm.). Interestingly, despite this disruption of the distribution and

marketing system, annual production of liming materials more than tripled over the next 25 years (fig. 6) reaching a peak annual production of 207 kt/year in 2001 despite closure of some quarries.

Component costs of applying bulk agricultural liming materials

Costs of applying liming materials to soils has three main components: the ex-works price that includes costs of quarrying and crushing plus taxes; transporting the lime from the works and spreading on the paddock; and an environmental cost (carbon dioxide released into the atmosphere).

The ex-works price includes costs of quarrying and crushing, royalties paid to the Tasmanian Government ($0.66/t^{-1} in 2019) and a Goods and Services Tax (GST) of 10%. Indicative ex-works prices for agricultural limestone and dolomite were about $37.50 and $48.50/t^{-1}, respectively, in 2020.

The cost of transporting and spreading crushed agricultural lime products was and still is a significant component of liming agricultural land. Current estimates indicate a rate of $10–15/t^{-1} depending on quantities to be applied, the application rate and the distance from the source. Estimated costs of transporting liming materials are between $1.55 and $1.70/km^{-1} when delivered in a 42-tonne truck (TWU Owner Driver Guideline Rates 2018). This equates approximately to $2.00/t^{-1}.50 km^{-1}. However, in Tasmania, most agricultural properties are located within 50 km by road of one of the current producers of bulk agricultural liming materials (2020). Only the northeast and east coasts, Derwent Valley and central plateau are further away, but none exceed more than 150 km from a lime source.

Average losses of carbon dioxide to the atmosphere from Tasmanian limestones is about 0.12 t/t^{-1} of limestone and 0.13 t/t^{-1} of dolomite when calculated using National Greenhouse Accounts factors (Energy 2018). These values are about one quarter of the loss on ignition (tab. 1) which represents maximum losses of carbon dioxide to the atmosphere.

TABLE 3 –The percentage of Mole Creek agricultural limestone of different particle sizes that dissolved in periods from one to 30 weeks (Stackhouse 1985)

Weeks	1	6	18	30
Particle size (mm)	% dissolved			
<0.25	80	100	100	100
0.25–0.5	30	85	100	100
0.5–1.00	5	30	60	90
1.00–2.00	0	15	30	50

Effectiveness of Tasmanian liming materials

Apart from the quantity applied, the effectiveness of limestone and dolomite to neutralise soil acidity (increase soil pH) is usually quantified by its potential neutralising value (expressed as a % of pure calcium carbonate) and their rates of dissolution. Dissolution of limestone particles by acid soils has been studied by measuring the amount of limestone remaining in the soil over increasing periods of time.

Rate of dissolution

The rate of dissolution is dependent on the surface area of particles: smaller particles dissolve more quickly. This is apparent in table 3 for samples of Mole Creek limestone of different particle sizes.

Two different models have been proposed to describe dissolution of limestone particles when intimately mixed with moist soil: (i) a first order chemical reaction; and (ii) the equal-diameter reduction model.

A first-order chemical reaction

The dissolution of limestone proceeds according to a first-order chemical reaction and is therefore independent of the amount of limestone added (Daniliuc *et al.* 1968). The reaction rate constant (K) obtained in Daniliuc's experiments was highly correlated with specific surface area of the limestone particles and percent base saturation of the soil. The half-life of first-order reactions is a constant that is independent of the initial concentration.

The equal-diameter reduction model

Rates of limestone dissolution have also been described by the equal-diameter reduction model. This model assumes that the rate of reduction in diameter of limestone particles is the same for all particle sizes, hence, if particle A has a diameter twice that of particle B it will take a twice as long to completely dissolve as does particle B (Barber 1967).

A complete mathematical derivation of the equal-diameter reduction model has been developed and tested (Swartzendruber & Barber 1965). Their model assumes: (a) the initial mass of limestone is present as spheres of uniform size, density and composition; and (b) the rate of loss of mass is directly proportional to the instantaneous surface area of the spheres. Mathematical formulation of the second assumption is $dm.dt^{-1} = kS$ where m is mass of limestone that has dissolved from the surface after time t, that limestone spheres have been uniformly mixed with the soil, k is a proportionality constant and S is the total surface area of the spheres.

They were then able to show that $M.M_0^{-1} = (1–ct^3)$ where M_0 is the initial mass, M is the dissolved mass, and C is equal to $2k\rho.D_0^{-1}$ where ρ is the density, and D_0 is the initial diameter of the spherical particles. Rearrangement of this equation gives $(1-M.M_0^{-1})^{1/3} = 1–ct$. Thus a plot of $1–M.M_0^{-1}$ vs t should give a straight line with a slope of –c and an intercept of 1. This relation has been shown to fit experimental data (Elphick 1955) for limestone particles of various sieve sizes (Barber 1967). It can readily be shown that the equation also applies to other geometrically regular forms (e.g., cubes, prisms and cylinders). Consequently, it should not be unexpected that it also provides a very

good approximation for irregular materials (Kriege 1929) as cited (Barber 1967).

These models fit the data in table 3 with the linear relation accounting for more than 98% of the variance in limestone dissolution. Extrapolation of the linear regressions predicts that all limestone particles are dissolved in about eight months for particle sizes 0.5–1.0 mm and three years for particle sizes 1.0–2.0 mm.

In practice, particle size selection of agricultural liming material is usually based on the perceived need for a quick reaction (finer lime) balanced against cost (higher cost of grinding finer lime). To illustrate this, the following comparison is made: the average amount of standard commercial limestone from Railton and Mole Creek sources are compared with the fine limestone from Flowery Gully (tab. 1) based on estimated amounts of limestone dissolved after six weeks (tab. 3). In this instance, 63.0% of standard commercial limestone has dissolved compared with 82.5% of FGFL. Thus 1.3 times as much standard grade limestone would need to be applied to be equivalent to the FGFL (tab. 1). In the case of superfine limestone (<0.1 mm), only 1.6 times as much standard commercial limestone is required to produce equivalent amounts of dissolved limestone at six weeks. The ex-works cost from Flowery Gully (2021) of 1.6 t of commercial limestone is \$61.60 at \$38.50/t^{-1} and \$99.00/t^{-1} for superfine limestone. Consequently, commercial grade limestone applied at the higher rate has both a cost advantage of \$37.40 and residual liming value advantage due to undissolved limestone.

Regulation and registration of agricultural liming materials

In practice, the amount of lime product that can pass through sieve meshes of various sizes is used as a proxy for surface area. In 1954, lime products that were sold in Tasmania to (i) increase soil pH, or (ii) as a soil conditioner or as (iii) a fertiliser had to be registered by the Tasmanian Government. Initially, the Statutory Rules (1954, No 69) under the *Stock Medicines, Fertilisers and Pesticides Act 1950* were established to control quality of liming materials at the time when the Tasmanian Government had begun to fully subsidise rail transport of liming materials. These Statutory Rules also assured purchasers that material met minimum standards and that agricultural lime producers could compete on a level playing field. The Statutory Rules included minimum amounts of calcium for burnt lime (CaO ≥80% ≡ Ca ≥ 57%) and limestone (CaO ≥ 40% ≡ Ca ≥28.6%) as well as fineness of limestone. All ground limestone was required to pass through a sieve with a one-eighth inch aperture (3.2 mm) and 50% through a one-fiftieth inch aperture (0.5 mm).

Lists of registered fertilisers and other products, including liming materials, were published by the Fertiliser Board in *The Tasmanian Journal of Agriculture* each year 1955–73 and again in 1975. However, no further lists were published in the years until the journal ceased publication in 1981. Samples of agricultural liming materials were submitted by manufacturers each year for evaluation. This was a simple and practical system of quality control that was well understood by farmers and lime producers.

In 1993, the National Competition Review recommended that state legislation should be reviewed to remove impediments to trade between Australian states. This resulted in a negotiated decision to apply the same set of rules and regulations for the sale of agricultural liming materials in all states. This enabled liming materials to be readily sold across state borders using the same regulatory requirements. This is a potential advantage for lime producers and farmers in mainland states but of little value to Tasmania because of the freight costs associated with Bass Strait.

The Fertilizer Regulations (2005) under the 1993 *Fertilizer Act* specify minimum standards for neutralising value, Ca%, Mg% and effective neutralising value (ENV). It also introduced the concept of grades of limestone. The implications for Tasmania of the new act and associated regulations were, firstly, to remove the need for annual registration of liming materials and a specification of a maximum particle size of the material. Secondly, it introduced complexity by including the concept of effective neutralising value (ENV) as well as three grades of liming materials based on neutralising value, calculated ENV and minimum levels of Ca% and Mg%.

Comparison of the Fertilizer Regulations 2005 with Fertilizer Regulations 2017 (Anon. 2017) showed that specifications for agricultural liming materials were unchanged between 2005 and 2017. The minimum specifications for each grade of limestone and dolomite are shown in table 4. It should be noted that Tasmania does not produce any magnesite lime for agricultural purposes.

Effective neutralising value is a theoretical construct that seeks to discount the value of coarser particles in favour of finer particles to better reflect the faster dissolution of fine particles in the immediate to short term. It is also potentially misleading as it could readily be inferred that effective neutralising value is less than the neutralising value when all particles are fully dissolved.

Effective neutralising is calculated from neutralising value and particle size as follows:

$$\mathbf{A = (B \times E) + (C \times 0.6E) + (D \times 0.1E)}$$

Where **A** is the effective neutralizing value,
B is the proportion of weight of lime of particle size not greater than 300 μm (0.3 mm),
C is the proportion of weight of lime of particle size greater than 300 μm but not greater than 850 μm (0.3–0.85 mm),
D is the proportion of weight of lime of particle size greater than 850 μm (>0.85 mm, and
E is the neutralising value of lime.

Application of this formula to estimate ENV% of Tasmanian commercial liming materials, which was adapted from an article on limestone/dolomite quality (D Parsley and LA Sparrow pers. report held by author) is shown in table 5. The effect of applying this formula discounts the neutralising value of the Tasmanian liming materials but only Mole Creek Limestone is advantaged in the short term.

The above Tasmanian liming materials are defined as Grade 3 limestones because they have a larger proportion of larger particle sizes rather than low neutralising value. As explained previously, the rate of dissolution is probably

TABLE 4 – Estimated effective neutralising (ENV %) calculated from neutralising value (NV %) and particle size ranges specified in the Tasmania Fertilizer Regulations 2005[1]

Producer	<0.85 mm %	0.85–0.30 mm %	< 0.30 mm %	NV %	ENV %
Flowery Gully limestone	36.5	32.0	31.5	94.2	51.0
Railton limestone	37.5	30.5	29.0	96.2	50.8
Mole Creek limestone	23.0	36.5	40.5	95.7	61.9
Smithton dolomite	40.5	23.0	36.5	97.5	53.0

[1] D Parsley and LA Sparrow, pers. report held by author

TABLE 5 – Minimum specification for neutralising value (NV %), effective neutralising value (ENV%), calcium (Ca%) and (Mg%) for the three grades of Limestone/ dolomite[1]

Material	Grade	NV %	ENV %	Ca %	Mg %
Limestone, burnt or hydrated lime	1	80	80	30	-
	2	65	65	30	-
	3	50	50	20	-
Dolomite	1	80	80	14	9
	2	65	65	14	9
	3	50	50	9	6

[1] Adapted from Tasmania – Fertilizer Regulations 2017, Regulation 28, Schedule 2 (Anon. 2017)

TABLE 6 – Agricultural land, the area limed and the amount of agricultural limestone plus dolomite applied within each Natural Resource Management (NRM) region of Tasmania (ABS 2018)[1]

	NRM Cradle Coast	NRM North	NRM South	Tasmania total
Area of agricultural land (ha)	233,529	568,787	443,546	1,248,562
% of agricultural land	18.7	45.7	35.6	
Lime applied (t)	85,246	61,099	12,460	158,805
Area limed (ha)	71,376	24,686	5,031	101,092
Average lime rate (t/ha^{-1})	1.2	2.5	2.5	
% of region limed	30.6	4.3	1.1	
% of the lime applied	51.2	41.0	7.9	

[1] Calculated values for the percentage of agricultural land in each NRM region, the percentage of each region that is limed and the average rate of lime applied.

TABLE 7 – The amount (t) of different nitrogen fertilisers applied in each Natural Resource Management (NRM) region of Tasmania (ABS 2018)

Nitrogen fertiliser applied (t)	NRM Cradle Coast	NRM North	NRM South	Tasmania total
Urea (46% N)	18683	14190	1349	34222
Ammonium sulphate (21% N)	603	396	0	999
Potassium nitrate (13.8% N)	350	0	22	372
Ammonium phosphates (18% N)	3941	5146	1683	10771
other N based fertiliser (18% N)	10183	4758	689	15630
Lime required to neutralise the acidification caused by N fertilisers (t)[1]				
Urea (3.6)[2]	32567	24735	2352	59654
Ammonium sulphate (7.1)	946	690	0	1637
Potassium nitrate (0)	0	0	0	0
Ammonium phosphates (7.1)	5302	6923	2264	14488
Other N based fertiliser (7.1)	13699	6401	927	21026
Total lime required (t)	53124	38749	5581	–
Actual lime applied (t)	85246	61099	12460	–
(Lime applied).(Lime required)$^{-1}$	1.6	1.6	2.2	–

[1] The calculated amount of lime required to neutralise the acidifying effect of each nitrogen fertiliser was obtained by multiplying the amount of each fertiliser by its N% and its acidifying potential per kg of nitrogen[2] (Anon. 2021b) and assuming an average neutralising value of 95% for Tasmanian liming materials.

a better indicator than the arbitrary factors included in the Regulations 2005, 2017.

Regulation and registration in themselves are not sufficient to ensure that liming materials meet the standards. Almost invariably, the neutralising value of Tasmanian crushed stone meets specification but in some cases variability in neutralising values of lime sands can mean that they fail this standard. However, the more persistent issue has been that particle sizes have been too coarse (Hill 1958, Fert$mart 2015). The old maxim 'Buyer beware' should apply particularly where large quantities are being purchased. This could be supported by on-farm testing of delivered materials (Stackhouse 1985). Coincidently, the enactment of the new regulations in 2005 was associated with a marked decline in the use of ground liming materials, primarily driven by a decline in limestone production (fig. 6).

Current patterns of lime use in Tasmania

The pattern of lime use varies dramatically between NRM regions in Tasmania (tab. 6). Similarly, the use of nitrogen fertilisers and the amount of liming material required to neutralise this source of soil acidification varies between the NRM regions (tab. 7).

The Cradle Coast NRM region constitutes about 19% of the land used for agricultural production in the state but more than half (54%) of liming materials is applied to about a third of this region each year at an average rate of 1.2 t/ha^{-1} (tab. 6). The annual amount of liming materials applied is sufficient to neutralise about 1.6 times the acidifying effect of nitrogen fertilisers applied in this region (tab. 7).

The North NRM region constitutes nearly 45% of the land used for agricultural production and accounts for nearly 40% of liming materials. They are applied at a higher average rate of 2.5 t/ha^{-1} but to only about 4% of this region per year (tab. 6). Again, the annual amount of liming materials used in this region is sufficient to neutralise about 1.6 times the acidifying effect of nitrogen fertilisers applied in the region (tab. 7).

The Southern NRM region by comparison constitutes 35% of the land used for agricultural production but uses less than 8% of liming materials applied at 2.5 t/ha^{-1} to about 1% of the region/year^{-1} (tab. 6). The annual amount of liming materials used in this region is sufficient to neutralise about 2.2 times the acidifying effect of nitrogen fertilisers applied in the region (tab. 7).

This macro-scale analysis indicates that within each NRM region the amount of liming material applied is at least 1.6 times that required to neutralise the acidifying effects of annual applications of nitrogen fertilisers. This suggests that more than sufficient lime is being used to neutralise acidification, not only by nitrogen fertilisers, but other sources of soil acidification such as atmospheric sulphur and product removal. However, more detailed analyses at an enterprise or property level would be required to confirm that sufficient lime is being applied to account for all sources of soil acidification.

CONCLUSION

This history plots the production of agricultural liming materials from its uncertain beginning processing waste limestone screenings at one site to the production of high-quality, metallurgical grade limestone or dolomite from as many as 11 sites around Tasmania. Total production of crushed liming materials increased from about 4 kt in 1940 to a peak of 207 kt/year in 2000. Subsequently, annual production declined to an average of about 145 kt/year during the 14 years to 2020. This annual amount of lime is estimated to exceed the amount of liming material required to neutralise the acidifying effects of annual applications of nitrogen fertilisers by a factor of more than 1.6 leaving more than sufficient lime to neutralise other sources of soil acidification such as product removal.

Tasmania has extensive reserves of liming materials and existing quarries with proven resources for 20 to 50 years. The major risk to the supply of agricultural liming materials is the closure of the secondary processing industries that underpin the viability of the quarries and the consequent relatively cheap material. Future demand for liming materials will depend on the profitability of their use on responsive crops. Furthermore, soil acidification induced by inputs of sulphur from marine and industrial sources together with acidification from the nitrogen cycle, particularly nitrogen fertilisers, will need to be balanced. In addition, the environmental cost in terms of carbon dioxide release from the dissolution of the carbonates will need to be considered.

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APPENDIX 1

Annual production data for ground agricultural limestone and dolomite

Annual production data for both ground agricultural limestone and dolomite were mainly extracted from publically available annual reports at mrt.tas.gov.au produced by Mineral Resources Tasmania (MRT). Annual reports/reviews ceased publication at the end of 2010/11. Subsequent data was provided directly by MRT for both agricultural limestone and dolomite.

Agricultural limestone production from all sources was specifically differentiated from limestone used in cement, carbide, metallurgical and other uses in MRT annual reports in 1957 and thereafter. Production of ground agricultural limestone between 1941 and 1944 was from the Melrose quarry that was the only producer at that time. Between 1945 and 1956 production was calculated as the production from quarries at Melrose and Pulbeena plus half the production from Railton and Beaconsfield quarries where it was assumed that the other half was burnt for lime production. 100–80% of agricultural limestone came from Melrose between 1945 and 1950; and declining amounts (80–60%) came from Melrose and Pulbeena between 1951 and 1956 when other sources increased their production.

Agricultural dolomite production commenced at Smithton in 1952 and production data from this source was used until 1994/95 when dolomite production from Cressy commenced. Data collected before 1972 was recorded in imperial tons but was converted to metric tonnes to maintain consistency with subsequent data. Data was reported on a calendar year basis until 1979 before changing to a financial year basis. Data for the first six months of 1980 were excluded from estimates of annual production.

UPDATE ON FLUORESCENT MAMMALS AND BIRDS IN TASMANIA

by Lisa-ann Gershwin

(with 14 plates and two tables)

Gershwin, L (2023). Update on fluorescent mammals and birds in Tasmania. *Papers and Proceedings of the Royal Society of Tasmania.* 157: 79–97. ISSN: 0080–4703. Glow Show Tasmania, Studio 3, 71 Murray Street, Hobart, Tasmania 7000, Australia. Email: hello@glowshowtas.com

This paper builds on our existing knowledge of fluorescence in Tasmanian mammals and birds, with 25 new and updated observations comprising two species not previously reported to fluoresce, 12 species previously only reported from museum specimens, and updated information on 11 species, plus two colour-morphs not previously reported. In most cases, the coverage, intensity and colours of fluorescence differ dramatically between live or fresh road-killed animals and taxidermied museum specimens. It is reasonable to assume that almost all Tasmanian mammals and birds may exhibit some form of fluorescence, and that we are only yet scratching the surface of this most intriguing aspect of natural history.
Key Words: biofluorescence, Marsupialia, Aves, Tasmania, citizen science.

INTRODUCTION

In December 2022, Gershwin (2022) summarised the 'glowy' phenomena and organisms reported from Tasmania, including 14 new mammals and six new birds not previously reported to fluoresce. Some of these observations were made on museum specimens, while others were from fresh road kills, but most species had only one or the other. Quite strong differences were found in the fluorescence between these two groups, leading to the question: are they comparable? The large number of museum specimen records of fluorescence poses the question as to whether there was some effect of the taxidermy chemicals, rather than representing the true fluorescence of the species. More recently, Nummert *et al.* (2023) found different fluorescences in museum and live specimens of the garden dormouse *Eliomys quercinus*, and Reinhold (2023a) reported on different fluorescent pigments in different preservation regimes, both of which suggest that museum findings alone may be only half of the story. The purpose of this update is to add additional information to Gershwin (2022) from observations on live mammals and birds in Tasmania, some of which were previously only reported to fluoresce from museum or road-killed specimens, and others which are entirely new reports.

METHODS

Live animals were observed under ultraviolet (UV) light at night at three commercial wildlife operations in Tasmania (Bonorong Wildlife Sanctuary, East Coast Nature World and Bicheno Penguin Tours); and at various other locations around the state. Observations made on live animals at commercial facilities were undertaken with their explicit permission and all facilities are licensed under state legislation to enable nightly public tours using artificial lighting. All UV observations were undertaken with great care, approaching slowly from behind or beside the animal allowing it time to react to the UV. UV lights were generally at two or more metres from the animal, never aimed at the animal's head and the exposure time minimal. No mammals or birds that were observed demonstrated any perceivable reaction to the UV lights.

In addition to live animal observations, fresh road-killed specimens were examined on a variety of roadways around Tasmania, including Huon Valley, Cygnet, Bruny Island, Mount Wellington, Ridgeway, Richmond, Primrose Sands and Bicheno. 'Fresh road-killed' meant before sunrise of the morning following their death, before photobleaching occurred (see below).

Three different types of UV torches were used. Most observations were made from a distance primarily with a Dulex LED torch marketed with a wavelength of 395–410 nm, or to a lesser extent with a Lightfe UV302D 365 nm or an Alonefire SV004 LED torch marketed with a wavelength of 365 nm, of the types using one 18650 battery. Close observations (<2 m) were made with a small unbranded 12-bulb LED torch marketed as having a wavelength of 395 nm, of the type using three AAA batteries. White lights were not used. Note that differences in fluorescence intensity between wavelengths could be due to either the activation of fluorophores with different optimal excitation wavelengths, or the battery strength of the torch and its effect on activating fluorophores from varying distances.

Photographs were taken with either an iPhone 13 Pro, or with a Nikon D5100 or D7100 camera. Most photos are presented as straight from the camera, with only minimal cropping as appropriate. For some photos, the 'sharpening' tool was applied in PowerPoint software, as indicated in the captions. No other filters or enhancements were applied. Video was taken of some species interchangeably with any of the cameras; a screen-grab, where used, is indicated in the caption.

Species' common names are those used by the Australasian Mammal Taxonomy Consortium (AMTC, 2023) and the Working List of Australian Birds (WLAB, 2023).

FINDINGS

Short-beaked echidna *Tachyglossus aculeatus*

One captive individual was observed.

Naked eye: Under 365 nm, the spines and fur appeared very bright white. Under 395 nm, the spines and fur instead appeared bright pasty green. *Camera*: Both colour responses were captured on camera, though surprisingly dimmer than to the naked eye, with the fur appearing pale bluish-white (pl. 1A) and the green appearing mostly on the facial fur but duller elsewhere (pl. 1B); under both lights the spines appeared whiter than the fur. The skin on the snout did not noticeably fluoresce, appearing darker under 365 nm and reflecting the purple light under 395 nm.

Comment: Travouillon (2020), Gershwin (2022) and Reinhold (2023a) all reported the quills of museum specimens as glowing brightly under UV light. In Travouillon's photo posted on social media (no locality provided), the quills glowed pasty green (wavelength not specified, but likely 395 nm), while Gershwin's photo showed the quills more bluish-white under 395 nm light. The fur did not appear to glow in either case. In Reinhold's report, the fur glowed dull green while the spines were pale greenish-yellow. These earlier reports differ substantially from the present report of a live specimen displaying whole-body fluorescence, specifically the quills and the fur, in different colours at different UV wavelengths. The extent to which subspecific differences in furring and spination may account for these colour expressions, is unknown.

Eastern quoll *Dasyurus viverrinus*

One captive live individual was observed, plus four same-night road-killed animals.

Naked eye and camera: Under 365 nm, the spots were typically quite bright blue-white to blue-green, sometimes pink, and the facial fur appeared more distinctly green; the fur on the ventral surface and flanks was pink (pl. 2A, B, C). Under 395 nm, the face was even more pronounced green, and the ventral pink colours were even more brilliant. The fur and skin of the inner surface of the ears were consistently blue under both wavelengths, but the skin on the face did not appear to fluoresce. In plate 2C some of the straw in the foreground is illuminated red by artificial habitat lights and is not an effect of the UV lights.

Comment: In the live individual, the facial green fluorescence was prominent, but the ventral pink fluorescence was quite faint, possibly because of its adopted day-active lifestyle (see below for discussion of fluorophores photobleaching). All four same-night road-killed animals displayed similar intensities and coverage of pink.

Spotted-tailed quoll *Dasyurus maculatus*

One captive live individual was observed, plus one same-night road-killed animal.

Naked eye and camera: Same findings as for the eastern quoll (pl. 2C).

Tasmanian devil *Sarcophilus harrisii*

Seven captive individuals were observed.

Naked eye: Under 365 nm, the skin and fur areas of the inner side of the ears appeared bright white at a distance but were not viewed close. Under 395 nm, the inner side of the ears also appeared bright white at a distance, or distinctly green up close. To the naked eye, only the ears fluoresced: neither the white chest blaze nor black fur noticeably fluoresced under either wavelength. *Camera*: Under 365 nm, the skin and fur of the inner side of the ears and the chest blaze appeared richly blue (pl. 3A, B). Under 395 nm, the fur of the inner side of the ears appeared bright green while the skin appeared lightened but colourless, and the black fur of the chest and neck had a dark green sheen (pl. 3C). The chest blaze did not appear to fluoresce under 395 nm but merely reflected the purple from the torch.

Comment: Not all seven individuals were observed at the same distance or angle, and while individuals differed in the size of their chest blaze or coverage of green fur fluorescence, all fluorescence observed (or not) was consistent with the above findings across many dozens of photos and videos. These results differ from the fluorescence reported by Readfearn (2020), where the skin, eyes and teeth fluoresced, but not the fur.

The ears looked the same colour (white) at a distance under both wavelengths of UV with the naked eye, but the camera interpreted bright blue or bright green, depending on the wavelength. Whether this is due to our physiological limitations to colour perception in low light (Kelber *et al.* 2017), or some other phenomenon, is unknown. The neck and chest had a green sheen, but I have not observed this in other dark-fur species. Future studies are needed.

Thylacine *Thylacinus cynocephalus* (extinct)

One museum specimen was observed. This had been taxidermied, but the chemicals used were unspecified.

Update from Gershwin (2022): Observations were not made with 365 nm. Under 395 nm, five areas were briefly checked, namely an ear, the neck, the stripes, a flank and a foot. The only fluorescent colour observed was blue, which was different to the purple cast by the torch. To the naked eye, in most regions there were areas that appeared to fluoresce more brightly, though the camera largely missed these nuances. The skin and fur inside the ear fluoresced a lighter shade of blue than the fur on the outside (pl. 4A). On the neck, the area in the centre of the beam fluoresced a lighter shade than the rest (pl. 4B), which was not the case elsewhere on the body. On the flank, no difference

PLATE 1 – Fluorescence in the short-beaked echidna (**A** under 365 nm UV, **B** under 395 nm UV, images sharpened)

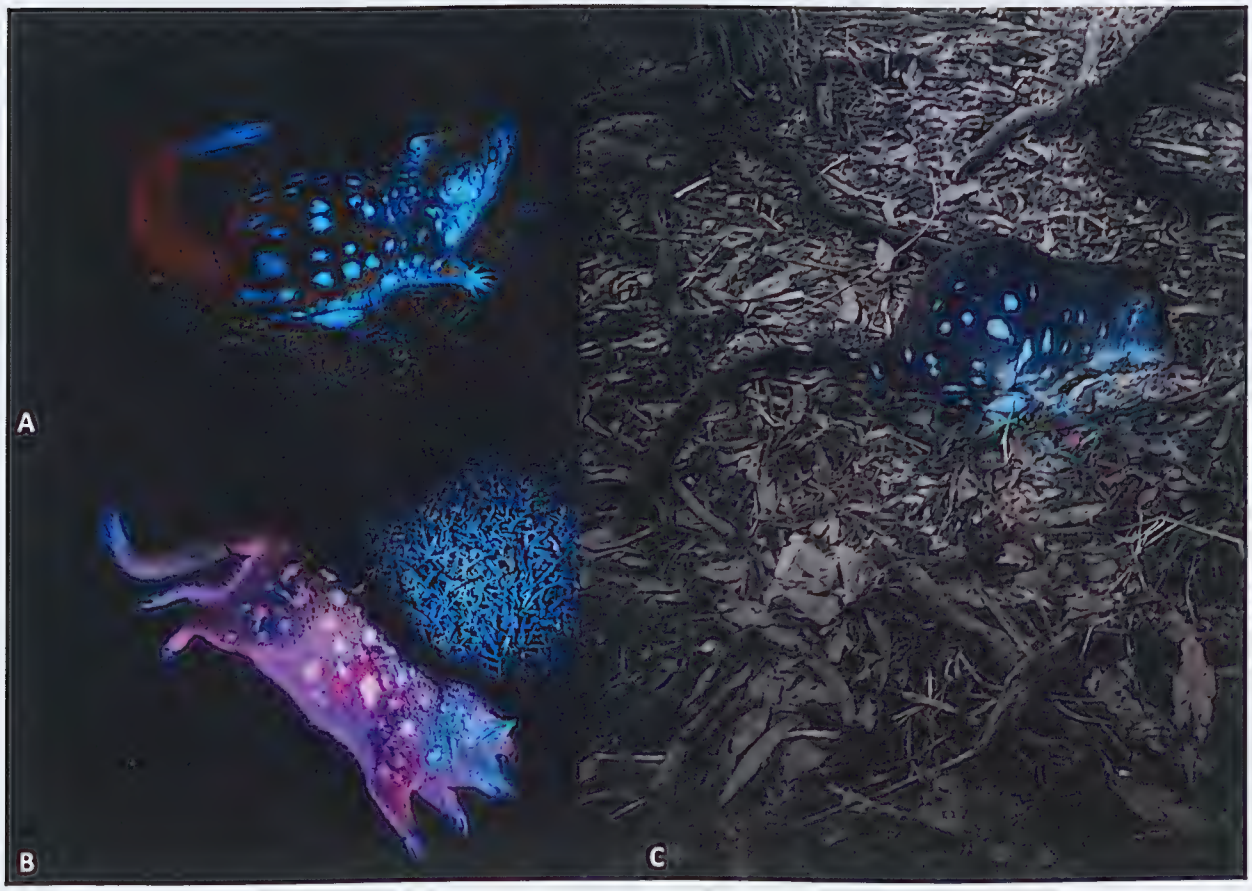

PLATE 2 – Fluorescence in quolls under 365nm UV light: (**A**) eastern quoll (live captive, copyright Benjamin Alldredge, (**B**) eastern quoll (road-killed), and (**C**) spotted-tail quoll (live captive)

PLATE 3 – Fluorescence in the Tasmanian devil (**A**, **B** under 365 nm UV, **C** under 395 nm UV, A video screen-grab, images sharpened)

PLATE 4 – Fluorescence in a thylacine specimen under 395 nm UV

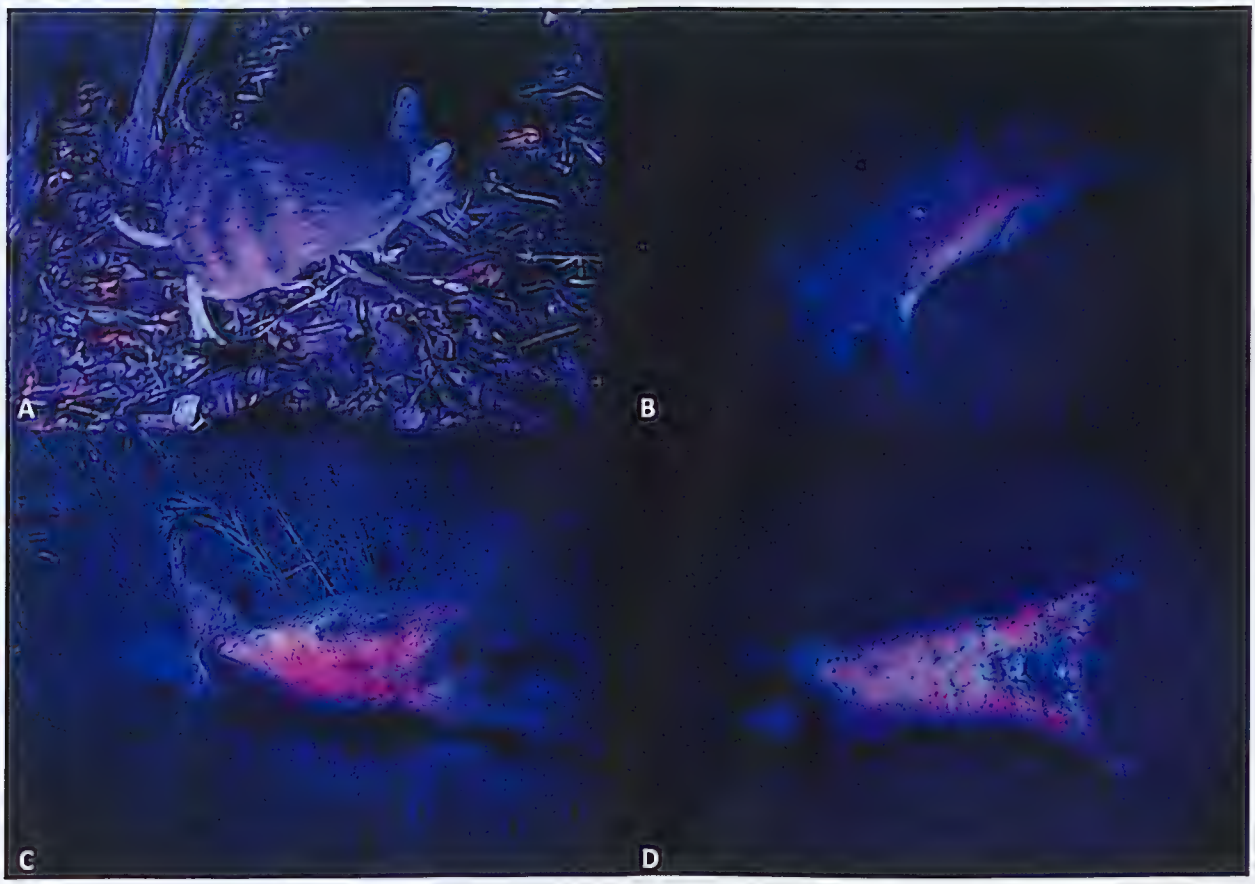

PLATE 5 – Fluorescence in two species of bandicoot under 395 nm UV. (**A**, **B** eastern barred bandicoot, **C**, **D** brown bandicoot) (Image B copyright Luis Mora)

PLATE 6 – Fluorescence in (**A**) the bare-nosed wombat under 395 nm UV and (**B**) Krefft's glider under 365 nm UV

was observed between structure or beam radius (pl. 4C). The lower leg exhibited the greatest fluorescence, being very noticeably a different shade of blue than the background plinth (pl. 4D). Whether these observations represent real animal fluorescence, or an artifact of the preservation and storage process is unknown; however, given the findings of Reinhold (2023b), the latter seems more likely. Moreover, because the specimen was behind glass, any anti-UV effect of the glass was not accounted for.

Eastern barred bandicoot *Perameles gunnii*

More than ten individuals were observed, two live in captivity, one live in the wild, and more than ten same-night road-killed animals.

Naked eye: Under 365 nm, the only fluorescence observed was pale pink on the belly fur, and bright turquoise on the skin inside the ear (pl. 5A, B). Under 395 nm, the fur on the belly and cheeks was brilliant pink and the back displayed some pale pink between the bars; the skin and fur of the ears were not noticeably fluorescent. The fluorescence displayed by live wild and captive animals was consistent with fluorescence displayed by same-night road-killed animals, though the live animals were not examined for a full ventral comparison. *Camera*: Live animal fluorescence was difficult to detect on camera because the animals moved were very fast. Same-night road-killed animals displayed brilliant pink belly, flanks and cheeks, sometimes appearing shimmery orange. Skin was not observed to fluoresce.

Southern brown bandicoot *Isoodon obesulus*

One live captive individual and three same-night road-killed animals were observed (pl. 5C, D).

Naked eye and camera: Same as the colours reported by Gershwin (2022) for road-killed specimens (note that Gershwin combined museum and road-killed observations in the table, whereas it should have been clarified that the colours indicated were for road-killed).

Bare-nosed wombat *Vombatus ursinus*

Three captive individuals were observed, one adult, two juveniles and one road-killed animal.

Naked eye: They were not observed under 365 nm light. Under 395 nm, the adult individual had a generalised light green hue to the body fur, while the outsides of the legs were dark green (pl. 6A). The juveniles had light green bellies, but the rest of the fur did not fluoresce. *Camera*: The adult wombat was not photographed, but the bright green bellies of both juveniles were visible on camera.

Comment: Edwards (2020) figured a museum specimen with distinctly green fluorescence in the body fur. I have observed a strikingly similar shade of green on the facial

PLATE 7 – Fluorescence in the common brush-tailed possum under 395 nm UV: (**A**) golden morph, (**B–E**) brown morph

fur and portions of body fur of a badly damaged same-night road-killed specimen, and on the belly of the live individual in plate 6A. During review, I was informed that the specimen figured by Edwards was likely preserved with arsenic soap; but the effect that that process may have had on the specimen is unknown.

Given that wombats are often day-active, and museum specimens have likely been exposed to a range of lighting and chemicals (see below), these observations of similar colours in live (or freshly dead) animals and taxidermied specimens raise questions about the durability of these fluorescent pigments or the complexity of interpreting the fluorescence of different furs with different chemicals.

Krefft's glider *Petaurus notatus*

Six captive individuals were observed.

Naked eye: Under both 365 nm torches, the fur was mostly sky-blue dorsally and ventrally, with a tuft of fur fluorescing purple below the ears. They were not observed under 395 nm light. *Camera*: The blue fluorescence was more pronounced with the camera than with the naked eye (pl. 6B).

Comment: Reinhold (2021) noted that the wild gliders observed in north Queensland only displayed ventral fluorescence, while the back absorbed the light. My observations differed from this, in that both the dorsal and ventral surfaces fluoresced. The reason for this difference was not investigated in this study. It could be the difference in wavelength of lights used: Reinhold (2021) used 395 nm, whereas I used 365 nm. It could also be the distance from the light source: Reinhold (2021) made her observations from 2.5 m, whereas mine were between 0.5 and 2.0 m. The only difference I noticed with distance from the light source was less vibrant colour in the pelage.

Common brush-tailed possum *Trichosurus vulpecula* (golden morph)

Three live captive individuals were observed, one adult male one adult female, and a late-stage joey.

Naked eye and camera: Under 365 nm, the fur on the head and feet was blue-green and on the chest and belly was pale pink (pl. 7A). Under 395 nm, the male's fur appeared pale golden with deep magenta irregularly-shaped areas consistent with new fur growth; the female's fur was bright pink on the belly and flanks, with a bluish-green face and paws. The inside of the female's ears (presumably skin and fur) fluoresced pale purple. The joey was uniformly brilliant pink across its body fur. The skin was not observed to fluoresce.

Comment: I believe this to be the first report of fluorescence in the golden possum. The female's pale purple ears were a different shade of purple than that emitted by the UV torch, so it seemed genuinely fluorescent, but it was also different from the more common blue ear fluorescence.

Common brush-tailed possum *Trichosurus vulpecula* (brown morph)

More than ten each of wild and road-killed individuals were observed.

Naked eye and camera: Under 365 nm, little colour was observed in earlier observations. Under 395 nm, there was high variability in body pelage fluorescence, ranging from uniformly deep caramel colour over the entirety of the body fur (pl. 7B, rarely observed); to the whole animal or abdomen brilliant pink (pl. 7C, the most common colour observed); to bright salmon-red over the posterior dorsal region (pl. 7D, the second most common colour observed); to more blue-green (pl. 7E, rarely observed). The fur of the face and on the top of the feet may be green, and the inside skin surfaces of the ears are typically light blue. Wild and freshly road-killed individuals were consistently spectacularly fluorescent; captive animals were not observed.

Comment: Bolliger (1944) reported that males possess vivid salmon red fluorescence over the back between the head and the middle of the rump (see my pl. 7C), whereas in females this salmon-red fluorescence is found in discreet tufts around the shoulder region. No attempt was made in the present study to correlate fluorescent colour pattern with sex. Bolliger also found that almost all the skin of this species (except the soles of the feet) fluoresces sky blue, and that this skin fluorescence is uncommon. Blue-fluorescent skin appears to be common in museum specimens, suggesting that either it is indeed common, despite Bolliger's findings, or that it is due to the taxidermy process or fumigation chemicals. One reviewer suggested that pigmented beeswax or taxidermy paints are applied to exposed skin areas to bring them back to a life-like appearance. So, for public taxidermies, no untreated dead skin remains. Additionally, taxidermied pelts have been washed before preparation interfering with sweat-gland fluorophores. These facts are particularly important as they demonstrate why we must proceed with caution in comparing fluorescence in museum and live or recently-killed specimens.

Moreover, Bolliger found that the hairless inner surface of the external ears of this species is coated with a strongly blue-fluorescent material which can be scraped away. I have found this same colour commonly in the ears of many other marsupials, particularly possums and macropods, so it is possible that a similar coating may be found in the ears of other species. Intriguingly, it is the commonest fluorescence that I have observed in live, road-killed, and museum specimens.

Eastern bettong *Bettongia gaimardi*

Five captive individuals were observed.

Naked eye: Under 365 nm, bettongs were bright but colours of both green and pink were pale and difficult to perceive (pl. 8A). Under 395 nm, the belly fur was bright pink while the fur of the face, legs and tail was minty green. *Camera*: The green was more apparent to the naked eye than in photographs, and the pink was very strong to the naked eye.

PLATE 8 – Fluorescence in (**A**) the eastern bettong under 395 nm UV and (**B**) the forester kangaroo under 365 nm UV; images sharpened

PLATE 9 – Fluorescence in the red-necked wallaby under 365 nm UV: (**A**) grey-brown morph, (**B**) Bruny Island white morph)

PLATE 10 – Fluorescence in a brown rat observed under 395 nm UV

PLATE 11 – Fluorescence in (**A**) a tawny frogmouth under 395 nm UV, (**B**) a Tasmanian masked owl under 395 nm UV, and (**C**) a Tasmanian masked owl under 365 nm UV. Images A and B sharpened.

PLATE 12 – Fluorescence in (**A**) the Cape Barren goose and (**B–D**) the little penguin under 395 nm UV, except C, under 365 nm UV. Images A and B sharpened.

PLATE 13 – Fluorescence in (**A**) the yellow-tailed black cockatoo, (**B**) the sulphur-crested cockatoo and (**C**) the pink cockatoo (under 365 nm UV. Images sharpened.

Comment: Live bettongs were difficult to photograph as they move rapidly; however, the colours observed in live animals differed from the museum specimen reported by Gershwin (2022).

Eastern grey kangaroo *Macropus giganteus* (forester kangaroo)

More than ten captive individuals were observed.

Naked eye: Under 365 nm, the legs appeared light but not green. Under 395 nm, the fur on the legs appeared distinctly minty green but the body did not appear to glow (pl. 8B). *Camera*: Photographs were only taken with 365 nm: the light parts of the animal glowed pale blue, especially the inside surfaces of the ears, the nose and the fur of the belly, back legs and underside of the tail.

Comment: I believe this to be the first report of fluorescence in the eastern grey kangaroo.

Red-necked wallaby *Macropus rufogriseus* (Bennett's wallaby, brown morph)

More than ten each of live wild and road-killed individuals were observed.

Naked eye: Under 365 nm and 395 nm, the fur of the tail and hind legs appeared bright, with a hint of minty green (pl. 9A). *Camera*: The minty green was more apparent with the camera than to the naked eye and was more apparent with the 395 nm than 365 nm wavelength.

Red-necked wallaby *Macropus rufogriseus* (white wallaby, white morph)

Two wild individuals were observed.

Naked eye: Under 365 nm, the entire animal appeared bright white with a slightly green tint (pl. 9B). Under 395 nm, the white was less pronounced, and no tint was perceptible. *Camera*: Under 365 nm, the whole animal appeared uniformly minty green. Photographs were not taken with 395 nm light.

Comment: Bruny Island has both albino and non-albino white wallabies. I believe that both of my observed individuals were non-albinos, leaving open the question of potential difference in fluorescence. I believe this to be the first report of fluorescence in the white wallaby.

Brown rat *Rattus norvegicus*

One freshly killed individual was observed.

Naked eye and camera: Not observed under 365 nm. Under 395 nm, the belly, chest and genital area fluoresced bright green-blue, while the fur on the tops and the skin on the soles of the feet fluoresced bright pink (pl. 10). The fur on the back of the head and neck fluoresced green-blue but much less vibrantly than the belly, while the fur of the forehead and the snout fluoresced pink, but much less than the feet. The sides of the body, back and outer shoulder and thigh areas of the legs did not fluoresce. Other structures like teeth and ears were not examined.

Comment: Fluorescence in rodents has been reported previously (Rebell *et al.* 1956, Udall *et al.* 1964, Reinhold 2021). For example, Udall reported that a large series of Old and New World rats exhibited a brilliant green-blue fluorescence. Similarly, Reinhold (2021) reported an introduced black rat *Rattus rattus* that fluoresced green to the naked eye but interpreted by the camera as bright cyan. Rebell *et al.* (1956) examined albino brown rats *Rattus norvegicus* and found that their pelage fluoresced brilliantly under ultraviolet light but not the legs, feet or skin. Reinhold (2023c) found bright bluish fluorescence in the whole pelt of a brown-hooded *R. norvegicus*. The pelage of the brown specimen of the same species in plate 10 indeed strongly fluoresced green-blue, but in contrast to Rebell's findings, both sides of the feet fluoresced pink. While the soles of the feet were almost certainly only skin, the tops of the feet were furred; whether the fur fluoresced pink, or skin fluorescence shone through the fur, is unknown. Curiously, Tumlison and Tumlison (2021) found green fluorescence on the postcranial dorsal surface of their *R. norvegicus* specimens, but not on the head, nor did they note it for the ventral surface. This is opposite of the pattern observed here.

The pink fluorescence in plate 10 may be due to congenital porphyria (Toussaint *et al.* 2023), a rare condition that causes red bones and fluorescent tissues, as has been found in rats (Rivera & Leung 2008) and rabbits (Samman *et al.* 1991). It could also be naturally occurring chlorophylls in the food that cause the skin to fluoresce pink or red (Weagle *et al.* 1988). My rat had an uncontrolled diet in the fortnight before its death including a sublethal amount of rat poison. The extent to which any of these foodstuffs may have contributed to its pink fluorescence was unknown.

Tawny frogmouth *Podargus strigoides*

One wild individual was observed.

Naked eye and camera: Not observed under 365 nm. Under 395 nm, the bill was green; the plumage was mottled but purple light leaking from the visible spectrum made feather fluorescence difficult to determine (pl. 11A). Gershwin (2022) noted turquoise-coloured fluorescent toes in a museum specimen; fluorescence of the toes was not noted in this specimen. When it took flight, the underwings were bright pink. Not photographed in flight.

Tasmanian masked owl *Tyto novaehollandiae castanops*

Four captive individuals were observed.

Naked eye and camera: Under 365 nm, the plumage of the facial disc was bright blue. Under 395 nm, the face was bright white with blue-green fluorescence of the feathers around the bill; the chest and some wing feathers were pink (plate 11B). The skin around the eyes was not observed at close range for comparison with Gershwin (2022) and was not observed to fluoresce at a distance; however, the light was not shone directly at the owls' faces. In flight, one

individual displayed deep red underwings, while another displayed bright pink. Not photographed in flight.

Cape Barren goose *Cereopsis novaehollandiae*

Two semi-captive individuals were observed, one male and female.

Naked eye and camera: Under 365 nm and 395 nm, the cere of the bill was vibrant green (pl. 12A). The plumage did not appear to fluoresce.

Comment: Gershwin (2022) did not report the vibrant green fluorescence of the bill but reported that the feet of museum specimens of this species were green; the feet were not observed in the live animals in this study.

Little penguin *Eudyptula minor*

More than ten wild individuals were observed.

Naked eye: Under 365 nm, the breast appeared pale blue. Under 395 nm, the breast appeared whitish-blue and the back of the flipper was bright blue. *Camera*: Under 365 nm, the breast appeared richer sky blue than it had with the naked eye (pl. 12C). Under 395 nm, the breast appeared periwinkle blue (pl. 12B, D) and the back of the flipper was bright blue (pl. 12D).

Comment: I believe this to be the first report of fluorescence in the little penguin.

Yellow-tailed black cockatoo *Zanda funerea*

Two captive individuals were observed.

Naked eye and camera: Under 365 nm, the yellow portions of the cheeks and tail feathers were bright golden yellow, and the breast feathers were flecked in gold (pl. 13A). Under 395 nm, the yellows and golds were similarly brilliant, plus the eyes, beak and feet were royal blue.

Comment: Fluorescence in this species was previously reported by the Australian Museum (AusMus 2001, gallery 1).

Sulphur-crested cockatoo *Cacatua galerita*

Three captive individuals were observed.

Naked eye and camera: Under 365 nm and 395 nm, the crest, under-tail feathers and underwing feathers were brilliant yellow-orange; the feathers of the cheeks and to a lesser extent the nape were fiery orange underneath but white on the surface (pl. 13B). Under 395 nm the white feathers appeared purplish due to reflection from the purple light; under 365 nm, the plumage appeared bluish, though it was unclear whether this was due to reflection or fluorescence.

PLATE 14 – Fluorescence in (**A**) the long-billed corella under 365 nm UV and (**B**) the yellow wattlebird, (**C**) the green rosella and (**D**) the laughing kookaburra, all under 395 nm UV

Comment: Fluorescence in this species has been reported numerous times. Pohland (2007) reported that the white secondary feathers lacked UV but included this species in a table of 'birds with fluorescent plumage parts', without further detail. The fluorescence of this species was also featured in a webpage on glowing parrots by the Australian Museum (AusMus 2001, gallery 9), and in a post by a blog user (Rosequoll 2008). As well, Völker (1937) reported fluorescence in the lesser sulphur-crested cockatoo, *Cacatua sulphurea*, a closely related species.

Pink cockatoo *Cacatua leadbeateri* (formerly Major Mitchell cockatoo)

Three captive individuals were observed.

Naked eye and camera: Under 365 nm, the body feathers were pale blue; the head and chest feathers, normally pink in daylight, were a more muted dusty rose pink and the orange portion of the crest was extremely vibrant (pl. 13C). Observations under 395 nm were not noted.

Comment: Pohland (2007) included this species in a table of 'birds with fluorescent plumage parts', without further detail. I believe this to be the first detailed report of fluorescence in the pink cockatoo.

Galah *Eolophus roseicapilla*

Two captive individuals were observed. Neither had any observable plumage fluorescence under either wavelength of UV light, by naked eye or on camera.

Comment: Pohland (2007) reported that the grey primary feathers did not fluoresce. Pale bluish fluorescence of the beak and skin around the eyes was reported in a taxidermied specimen from the Western Australian Museum (Readfearn 2020). In this examination of live specimens, neither the grey nor pink plumage fluoresced, nor did the beak or skin, but I did not shine the light directly at their head.

Long-billed corella *Cacatua tenuirostris*

Two captive individuals were observed.

Naked eye and camera: Under 365 nm, the breast feathers appeared pale pink, while those of the face that are normally white were bright orange (pl. 14A). The bright red feathers of the face and chest were dark red. The bill and feet were pale blue. Observations were not made under 39 5nm.

Comment: Pohland (2007) included this species in a table of birds with fluorescent plumage parts, without further detail. This may be the first detailed report of fluorescence in the long-billed corella.

Yellow wattlebird *Anthochaera paradoxa*

One taxidermy display museum specimen was observed.

Naked eye and camera: No observation was made with 365 nm. Under 395 nm, the wattles were very bright blue, and the skin behind the eye and at the base of the beak also exhibited fluorescence (pl. 14B).

Comment: I believe this to be the first report of fluorescence in the yellow wattlebird. Pohland (2007) reported fluorescence in the red wattlebird, *Anthochaera carunculata*, from southern Australia. How this museum fluorescence relates to that displayed by the live bird is unknown.

Green rosella *Platycercus caledonicus*

One live captive individual and one taxidermy display museum specimen were observed.

Naked eye and camera: No observation was made with 365 nm. Under 395 nm, the entire breast and normally-yellowish part of the face was vibrant yellow in the live animal, while the same region displayed a more muted fluorescence in the museum specimen when viewed at a similar distance (pl. 14C).

Comment: Of all the animals examined, this species had the closest similarity between natural live and preserved colour. Fluorescence in this species was first reported by Pohland (2007) without detail. Fluorescence in this species is far more pronounced than that reported for the eastern rosella *Platycercus eximius* (AusMus 2001, gallery 2) or that reported for the pale-headed rosella *Platycercus adscitus palliceps* (Völker 1937).

Laughing kookaburra *Dacelo novaeguineae*

Two captive individuals were observed.

Naked eye and camera: No observation was made with 365 nm. Under 395 nm, the bill was vibrant sky blue (pl. 14D). No other part of the bird appeared to fluoresce at this time of day.

Comment: Pohland (2007) reported that the white breast feathers contained UV.

Tables 1 and 2 are updated from Gershwin (2022) to reflect these new records and to show comparison between live/fresh and taxidermied specimens. Note that for some of the external references in these tables, the animals were from different states of Australia, so the potential for geographic variation has not been considered.

DISCUSSION

This report includes 25 new observations of fluorescent animals in Tasmania: new reports of mammals (1) and birds (1), not previously reported to fluoresce; new reports of live mammals (4) and birds (8) only previously reported from taxidermied specimens; and updated live reports of previously reported live or freshly road-killed mammals (8) and birds (3). In addition, the fluorescence of two colour-morphs not previously noted are here newly reported, making the total number of documented fluorescence to 22 mammals and 15 birds.

All live mammals observed under UV light exhibited some degree of fluorescence. as did most live birds except

TABLE 1 – Summary of fluorescence in mammals found in Tasmania

Species	Fluorescence (Live/freshly dead)	Fluorescence (Taxidermy)
Fluorescent Tasmanian Monotremes		
Platypus *Ornithorhynchus anatinus*	Some fur dull moss green (Reinhold 2020, 2023a frozen, Readfearn 2020)	Bright blue-green fur and skin (Anich *et al.* 2021) Faintly dark green toes (Gershwin 2022) Green/cyan (Toussaint 2023)
Short-beaked echidna *Tachyglossus aculeatus*	Fur dull moss green, spines pale greenish yellow (Reinhold 2023a road killed) Whole animal bright white or pasty green (updated live report)	Bright whitish quills (Travouillon 2020, Gershwin 2022)
Fluorescent Tasmanian Marsupials		
Eastern quoll *Dasyurus viverrinus*	Spots blue-green, belly bright pink, face green (new live report)	Violet-blue ears (Gershwin 2022)
Spotted-tailed quoll *Dasyurus maculatus*	Spots blue-green, belly bright pink, face green (new live report)	Violet-blue ears (Gershwin 2022)
Tasmanian devil *Sarcophilus harrisii*	Blue ears (Readfearn 2020 live) Blue or green ears; blue blaze; green sheen to the black fur (updated live report)	Violet ears (Gershwin 2022)
Thylacine[1] *Thylacinus cynocephalus*		Bright blue bands on fur shaft under a fluorescence microscope, and whole animal glowing (Kean & Cutting 2022) Turquoise ear, body, and leg fur (Gershwin 2022, updated report)
Eastern barred bandicoot *Perameles gunnii*	Magenta belly, side fur and between stripes on back; ears light blue (Gershwin 2022 road-killed; updated live)	Light blue ears (Gershwin 2022)
Southern brown bandicoot *Isoodon obesulus*	Orange-pink fur ventrally, lighter on belly, deeper on thighs and biceps (Gershwin 2022 road-killed, updated live)	
Bare-nosed wombat *Vombatus ursinus*	Body fur light green, legs dark green (new live report)	Green fur (Edwards 2020) Light blue ears and skin around nose, white paws, dark green nose (Gershwin 2022)
Krefft's glider *Petaurus notatus*	Light blue fur on underside (Reinhold 2021 live); or all over (Reinhold 2023a frozen) Sky blue fur dorsal and ventral, with purple patch under ears (updated live report)	Turquoise ears and paws (Gershwin 2022)
Common brush-tailed possum *Trichosurus vulpecula*	*Common brown morph:* Sky blue skin; hairs many colours (Bolliger 1944) Green fur (ZIP 2018) Pink fur around face, neck, and belly (Gershwin 2022 road killed) Bright sky blue prominent on pale parts with 310-365 nm, pink more prominent dorsally with 380–410 nm (Reinhold 2023a frozen, road-killed and live) Body fur pink on belly, bright red on back, or uniformly dark red; face and feet may be green (updated live report) 'golden possum' morph: Bright pink ventrally; face and feet blue-green; ears purple (new live report)	Blue fur (Nicholls & Rienits 1971)

TABLE 1 – cont.

Species	Fluorescence (Live/Freshly dead)	Fluorescence (Taxidermy)
Eastern ring-tailed possum *Pseudocheirus peregrinus*	Brilliant white belly fur and white portion of tail, pale turquoise (Gershwin 2022 road-killed) Greenish white on cheeks and flecked through fur (Reinhold 2023a frozen)	
Little pygmy possum *Cercartetus lepidus*		Turquoise ears and paws (Gershwin 2022)
Eastern bettong *Bettongia gaimardi*	Ventrally bright pink; face, feet, and tail minty green (new live report)	Pale blue ears, eye skin, mouth and hind legs (Gershwin 2022)
Forester kangaroo *Macropus giganteus*	Legs minty green (new live report)	
Bennett's wallaby *Macropus rufogriseus*	*Common brown morph:* Blue-green hind legs, dark blue paws, bright turquoise tail and inner ears (Gershwin 2022 road-killed) Hind legs and tail minty green (updated live report) *Bruny Island white morph:* Uniformly minty green (new live report)	
Rufous-bellied pademelon *Thylogale billardierii*	Turquoise and white ears (Gershwin 2022 road-killed)	
Fluorescent Tasmanian Placentals		
Lesser long-eared bat *Nyctophilus geoffroyi*		Turquoise ears and fur around eyes (Gershwin 2022)
Broad-toothed rat *Mastacomys fuscus*		Turquoise nose (Gershwin 2022)
Swamp rat *Rattus lutreolus*		Turquoise lower and upper lips, nose, inner ears and penis (Gershwin 2022)
Water rat *Hydromys chrysogaster*		Turquoise lower lip and toes (Gershwin 2022)
Brown rat *Rattus norvegicus*	Fur bright light blue (Reinhold 2023c) Body fur bright green, tops and soles of feet bright pink (updated live report)	
Long-tailed mouse *Pseudomys higginsi*		Turquoise lower and upper lips and nose (Gershwin 2022)

[1] Indicates uncertainty, discussed in text.
The extent to which the fluorescence in museum specimens was natural fluorescence or an artifact of the taxidermy process requires further study.

TABLE 2 — Summary of fluorescence in birds found in Tasmania

Species	Fluorescence (Live)	Fluorescence (Museum)[1]
Tasmanian masked owl *Tyto novaehollandiae castanops*	Face bright blue, or white with blue-green, chest pink; underwings red or pink (new live report)	Pale blue skin around eyes, base of beak and feet; magenta feathers on underside of wings (Gershwin 2022)
Tawny frogmouth *Podargus strigoides*	Hot pink flight feathers (Blythman *et al.* 2016) Bill green, body plumage not fluorescent, underwings bright pink (updated live report)	Turquoise toes (Gershwin 2022)
Sulphur-crested cockatoo *Cacatua galerita*	Fluorescent (unspecified) (AusMus 2001, Rosequoll 2008) Crest, tail-feathers and underwings brilliant yellow-orange; face and nape feathers orange underneath (updated live report)	Fluorescent (unspecified) (Pohland 2007)
Yellow-tailed black cockatoo *Zanda funerea*	Fluorescent tail feathers (AusMus 2001) Yellow portions of cheeks and tail feathers brilliant golden, with flecks of gold on breast feathers; eyes, beak and feet royal blue (updated live report)	
Pink cockatoo *Cacatua leadbeateri*	Body pale blue, head and chest pink, orange portion of crest fiery orange (new live report)	Fluorescent (unspecified) (Pohland 2007)
Long-billed corella *Cacatua tenuirostris*	Breast pale pink, face bright orange; bill and feet pale blue (new live report)	Fluorescent (unspecified) (Pohland 2007)
Galah *Eolophus roseicapilla*	No perceptible plumage fluorescence; beak and eyes not examined (new live report)	Pale blue beak and skin around eyes (Readfearn 2020). Grey primaries not fluorescent (Pohland 2007)
Yellow wattlebird *Anthochaera paradoxa*		Wattles plus skin behind eyes and at base of bill bright blue (new report)
Laughing kookaburra *Dacelo novaeguineae*	Bill vibrant sky blue; body plumage not fluorescent (new live report)	White breast feathers contain UV (Pohland 2007)
Green rosella *Platycercus caledonicus*	Breast and face brilliant yellow (new live report)	Fluorescent (unspecified) (Pohland 2007). Breast and face dull yellow (updated report)
Wedge-tailed eagle *Aquila audax fleayi*		Bright turquoise toes (Gershwin 2022)
Superb lyrebird *Menura novahollandiae*		Pale blue toes and base of beak (Gershwin 2022)
Cape Barren goose *Cereopsis novaehollandiae*	Cere of the bill brilliant green (new live report)	Minty green feet (Gershwin 2022)
Black swan *Cygnus atratus*		Pale blue skin around eyes and beak (Gershwin 2022)
Little penguin *Eudyptula minor*	Chest, belly and back of flippers bright sky blue to periwinkle (new live report)	Light blue belly feathers and toe feathers (Gershwin 2022)

[1] The fluorescence observed in museum specimens may have been an artifact of the taxidermy process, but this requires further study.

for the galah. For eight mammals and ten birds, this report provides counterparts of museum and live or same-night road-killed specimens, allowing for a direct comparison of fresh and preserved fluorescent pelage and plumage. In almost all cases, the live and taxidermied specimens differed dramatically in their fluorescence displays. All the mammals I have observed with pink fluorescence in life, and most of the mammals with green or blue, lacked these colours as museum specimens. For example, the taxidermied quolls have only fluorescent purple ears, with no body fluorescence; in comparison, live or freshly dead quolls are psychedelic, some with bright pink spots and belly fur, and blue face, ears, neck and feet, while others lack the pink but make up for it with dazzling blue spots, head and belly fur. The wombat was the only mammal whose taxidermied fluorescence was similar to that in life, suggesting this may have been a coincidental similarity between preservation chemicals and natural green fluorescence. Birds, in comparison, seemed closer in their taxidermied and live fluorescence, but not always. Taxidermied and live little penguins both had blue chest plumage, although the mounts lacked the flipper fluorescence. Taxidermied green rosellas still had fluorescent chest plumage, but it was more muted than that in life.

The differences in fluorescence between taxidermied and live/freshly dead specimens may be explained to some extent by dramatically different photobleaching properties of different pigments. For tryptophan and its derivatives N-formyl kynurenine or kynurenine, for example, an experiment on human hair tresses showed a loss of most of the fluorescence within about 50 hours of simulated solar radiation (Longo *et al.* 2013), while wool exposed to daylight behind glass lost around a third of its tryptophan content by five months (Schäfer *et al.* 1997) and grey human hair swatches discoloured over months to years (Daly *et al.* 2009). For comparison, however, Galván *et al.* (2016) reported that the white-light porphyrin colouration in bustard feathers photobleached in as little as 12 minutes of exposure to natural sunlight, and Reinhold (2023b) found that pink luminescent bandicoot fur photobleached in just two minutes of direct sun exposure or a few hours with exposure to indoor lighting. The sensitivity of porphyrins compared with the durability of other fluorescent pigments helps explain why nocturnal animals that have become day-active in captivity, such as quolls and bandicoots, may lose their pink fluorescence, and why other diurnal or crepuscular animals such as the macropods and birds (and blonde or grey-haired humans) maintain their fluorescence.

In addition to the problem of photobleaching, another complication arises with the introduction of unnatural fluorescence in the preparation and storage of museum specimens and the photobleaching effects of others. For example, Reinhold (2023c) examined the effects of formalin or ethanol fixation, alcohol storage and chemical or alum tanning on bandicoot and rat fur, producing profound and inconsistent results between species. The message was clear: fluorescence of museum specimens may differ substantially from their colours in life. Reinhold (2023a, b, c) cautioned against using museum specimens alone to study animal fluorescence, noting the loss of fluorescent pigments by photobleaching and the addition of fluorescent pigments from taxidermy processes as well as chemicals and pesticides. Comparing Gershwin's (2022) observations with the present paper lends strong support to Reinhold's cautionary argument for many taxa, while also raising questions about similarity of fluorescence between live and preserved animals in others.

As a general rule, porphyrins fluoresce in pink, red or orange when excited with UV and violet light in the 390–405 nm range, while most of the familiar visible-fluorescence tryptophan metabolites glow in greens or blues (as well as other colours) when excited with the shorter wavelengths between 320–380 nm (Reinhold *et al.* 2023); the former corresponds well to the 395 nm torches widely in use, while the latter corresponds more closely to 366 nm torches used in earlier studies or the 365 nm used in this study.

My earlier observations and readings of others' findings were that macropods fluoresced green, while quolls, possums and bandicoots fluoresced pink with green faces and feet. I therefore expected macropods to be most colourful with the 365 nm torch, and the other animals to respond most strongly to the 395 nm; however, this was not always the case. For example, the wombat, kangaroo and echidna were most brilliantly green under 395 nm light. The echidna was instructive in highlighting the importance of investigating fluorescence with a variety of wavelengths to understand the range of emission colours.

Another confounding factor in interpreting animal fluorescence is the variation in display technology. While my iPhone 13 Pro revealed mostly similar colours to what I observed with the naked eye, this was not always the case. Pinks and reds generally displayed true to colour; however, sometimes glow that appeared colourless or pale blue or green to the naked eye had a more well-developed tint on camera. Sometimes the camera introduced completely artificial colour, such as the 395 nm light sometimes introducing a royal blue wash to the whole image on the phone camera that was not visually apparent; the DSLRs did not seem to have this issue. Even more troublesome was the difference between the camera and the computer: the computer monitors often changed the colour quite dramatically, by either bleaching of existing colours or substitution of other shades or hues entirely, and this changed quite dramatically from monitor to monitor. Resolving this problem is beyond the scope of this paper but should be considered when studying or comparing images of fluorescence.

These findings invoke the question of environmental influence on fluorescence. For example, my observations that captive bandicoots and quolls were generally far less vividly pink-fluorescent than their wild counterparts, and captive wombats and wallabies were less green-fluorescent than those in the wild, suggests captivity may influence fluorescence expression. It could be that emissions vary between wild, and captive held animals including their exposure to daylight and whether diet may play a role.

These psychedelic properties also beg the question of what purpose, if any, they serve for the animals; a topic pondered by others, (e.g., Pearn *et al.* 2001, Kohler *et*

al. 2019, Reinhold 2023a, Toussaint *et al.* 2023). As Reinhold has commented from time to time (pers. comm. 2022–2023), wild animals don't carry UV torches, so without one, do they perceive a more muted version of the dazzling fluorescence that we see with UV, or nothing at all, or a dazzling version of their own that we do not yet understand? And since most internal tissues of animals also fluoresce, e.g., blood, muscle, bone, etc., is fluorescence simply an evolutionary byproduct, or a spandrel in the Gouldian sense (Gould & Lewontin 1979)?

Finally, the question of exactly what wavelength animals see in is intriguing. In my observations, no vertebrates (but almost all invertebrates) reacted to UV light, despite our caution at using UV light, even at wavelengths that are not harmful to humans. Although the present paper advances our knowledge on pelage and plumage fluorescence in Tasmanian animals, compelling questions remain unanswered.

In their review of 111 years of fluorescence, Reinhold *et al.* (2023, p. 897) wrote 'Photoluminescence in animal tissues is so ubiquitous it is the norm, not the exception'. Indeed, the Tasmanian fauna are so gloriously fluorescent that it challenges us to see them literally and figuratively in a whole new light or as Darwin said (1859, p. 490), 'there is grandeur in this view of life'.

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ASPECT AFFECTS VEGETATION SUCCESSION AFTER TREE CLEARANCE IN A GRASSY WOODLAND IN TASMANIA

by Lars Roberts and Jamie B Kirkpatrick

(with four figures, three plates and three tables)

Roberts, L & Kirkpatrick, JB (2023). Aspect affects vegetation succession after tree clearance in a grassy woodland in Tasmania. *Papers and Proceedings of the Royal Society of Tasmania* 157: 99–105. ISSN 0080-4703. School of Geography, Planning and Spatial Sciences, University of Tasmania, Private Bag 78, Hobart, Tasmania 7001, Australia. (LR, JBK*). *Author for correspondence. Email: j.kirkpatrick@utas.edu.au

Old field succession is the process of vegetation recolonisation of abandoned sites in a passive method of restoration. Slope aspect could be expected to affect the nature of succession after clearance. We investigated variation in paired cleared and uncleared plots between three aspects in grassy woodland in northeastern Tasmania. PERMANOVA was used to assess relationship of species composition to clearance status, site aspect, their interaction, soil depth, litter cover, bare ground cover, rock cover and wood cover. Ordination was used to visualise similarities between combined aspect and clearance classes. Chi-squared was used to test for deviation of frequency of species between the aspect and clearance classes. Basal area of trees was tested for differences between clearance and aspect combinations. It was found that aspect, clearance, woody debris and rocks all affected species composition. An interaction between aspect and clearance class indicated that responses to clearance were influenced by aspect. Vegetation was most similar between clearance classes on the northwest aspect, where *Acacia mearnsii* was abundant, but limited on other aspects. Because the cleared area was not ploughed or fertilised, native grass and herb species persisted well on all aspects, making the cleared area as valuable for nature conservation as the uncleared area.
Key Words: old field succession, aspect, *Acacia mearnsii*, Tasmania, grassy woodland.

INTRODUCTION

Old field succession occurs in anthropogenically modified areas that have been abandoned and are passively recolonised by woody native plants, often ultimately resembling historic native communities (Cramer *et al.* 2008). Old fields can also succeed to novel states dependent on past practices, time since abandonment and the environmental context (Suding *et al.* 2004). The study of old fields is significant for restoration ecology, because we need to know the contingent circumstances in which restoration can be achieved without expensive interventions. It is also less expensive to compare the results of varying historic changes in the same environment than to test hypotheses through experimentation (Geddes *et al.* 2011). Old fields are of great relevance today as global markets and organisations respond to the UN Decade of Restoration (Fischer *et al.* 2021). Furthermore, as abandonment is a global trend, studies of old fields come from a diverse range of locations and historical contexts (Bonet & Pausas 2004, Tognetti *et al.* 2010).

Studies in Australia on old fields are limited. Seed availability, conditions that allow for germination and exotic taxa were major influences on recolonisation of old wheat fields in Western Australia (Standish *et al.* 2007a). Legacy effects of phosphate addition lowered native plant biomass in these old fields (Standish *et al.* 2007b). In central Victoria, an area of 8,185 ha of old fields was recolonised between 1946 and 2009; an area that would be extremely expensive to achieve through active methods (Geddes *et al.* 2011). In Tasmania, many vegetation types are known to recolonise old fields, including rainforest, grasslands, grassy woodlands, and dry and wet sclerophyll forests (Read & Hill 1983, Leeson 2011). Overall, the dynamics of old fields in Australia are similar to those observed globally (Cramer *et al.* 2008).

In temperate regions, slope aspect is considered an influential driver of species composition (Singh 2018). Equator-facing slopes are drier and warmer than poleward-facing slopes, greatly influencing ecosystem community composition (Gilliam *et al.* 2014). In the southern hemisphere, solar radiation is up to 50% greater on north-facing slopes, which increases temperature, evapotranspiration and soil weathering (Kirkpatrick & Nunez 1980, Gilliam *et al.* 2014). Aspect effects may be amplified in grasslands. In grassy ecosystems, soil moisture can be markedly reduced under woody vegetation, partly due to higher density of root hairs and higher root:shoot ratio in grasses (James *et al.* 2003). Furthermore, grasslands are often warmer, have less litter and are more exposed to winds than forests (James *et al.* 2003). In Tasmania, grazing by sheep and macropods is concentrated on northwest-facing slopes (Leonard & Kirkpatrick 2004).

While aspect has been included as a variable in several studies of old field succession with varying results, studies that contrast succession between aspects are sparse. Leeson (2011) found that aspect was a significant predictor of species composition in old fields for several study sites in Tasmania in a range of communities. In other countries, for example Spain, successful regeneration in *Pinus* spp. was influenced by aspect (Santana *et al.* 2010); however, aspect was found to be not significantly correlated with vegetation

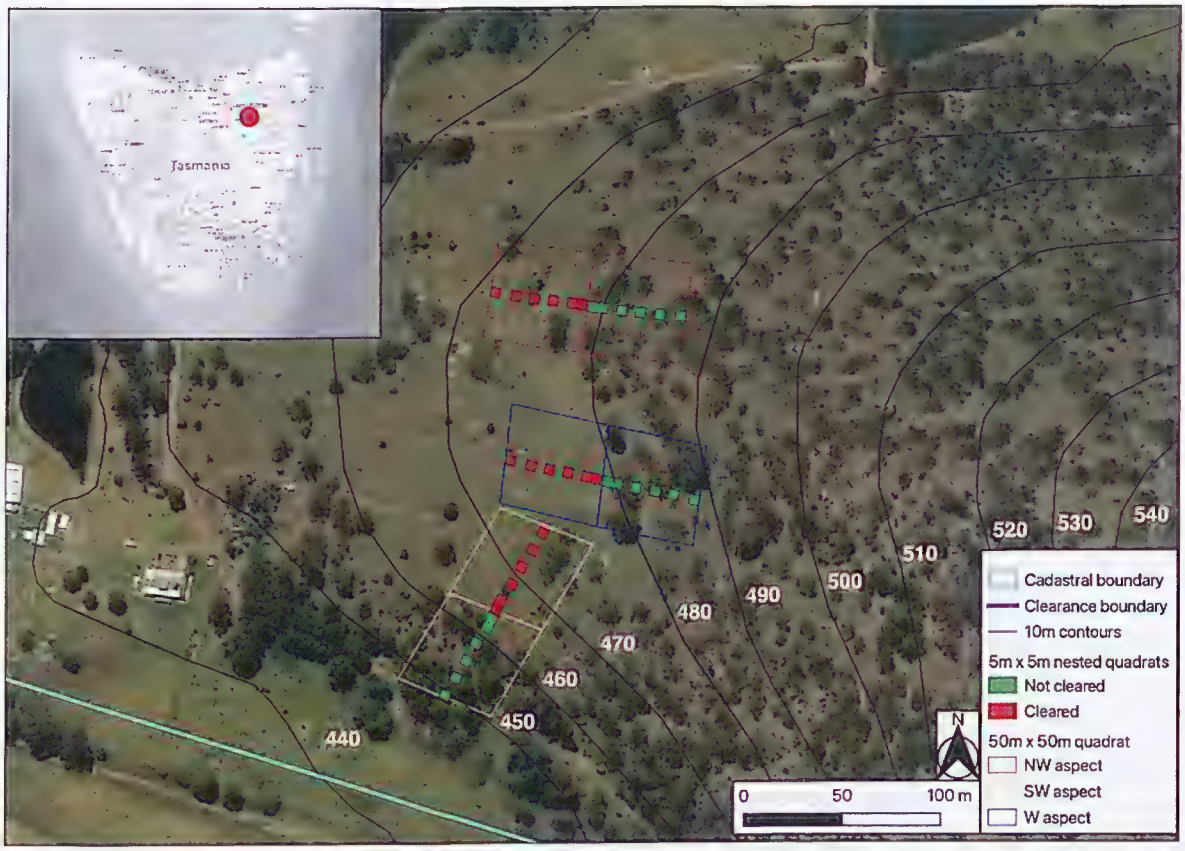

FIGURE 1 – Paired 50 m x 50 m quadrats of cleared and non-cleared vegetation across three aspects, northwest, west and southwest, with nested 5 m x 5 m quadrats. Top right corner is GDA94 MGA55 534112 E, 5403344 N. Data source: theLIST 2023.

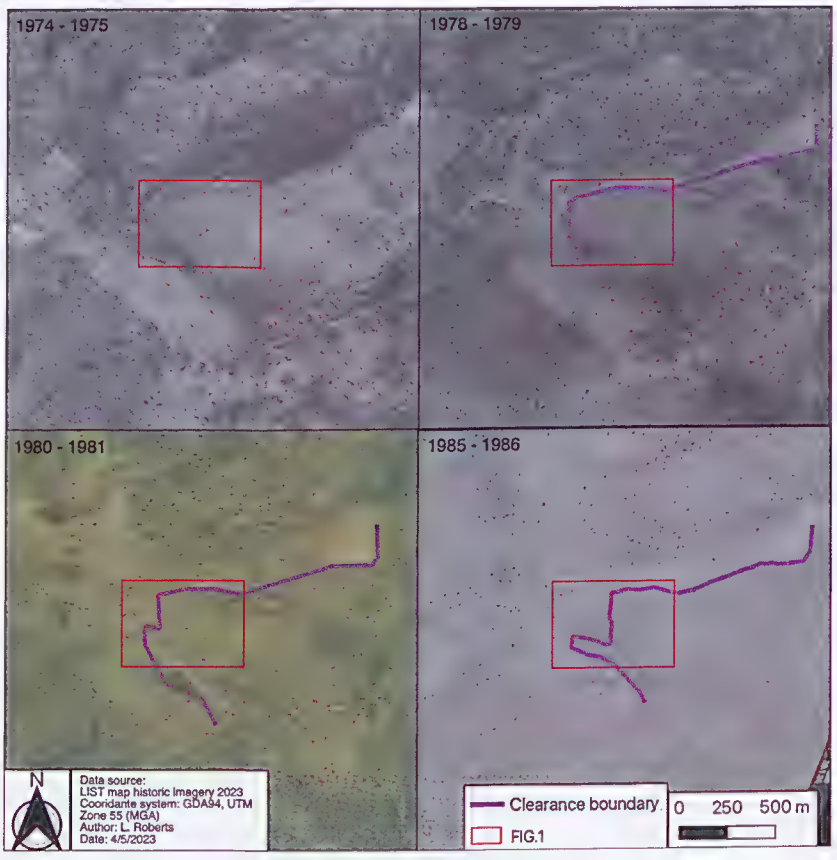

FIGURE 2 – Aerial imagery of the study site showing the gradual clearance of vegetation between 1978 and 1986.

attributes in tropical regions of the Andes (Sarmiento *et al.* 2003). Orientation had no significant effect in recovery of old fields in Romania (Ruprecht 2006), although the grouping of all southern aspects and all northern aspects in this study is coarse.

In this paper, we investigate the variation in affect of aspect on species composition and recolonisation over a clearance boundary in Tasmanian grassy woodland. We hypothesised that species composition and individual species respond to the interaction between aspect and clearance.

METHODS

Study area

The study area was on a private property at Blessington, Tasmania, on soils derived from Jurassic dolerite between 440 and 500 m above sea level (fig. 1). The mean annual rainfall is 666 mm with mean daily minimum temperatures in the coldest month of 2.4°C and mean daily maximum temperatures in the warmest month of 22.5°C (Land Tasmania 2023). The site is on a hillside with a slope of approximately 16% and ranging in aspect from southwest to northwest. The vegetation is a *Eucalyptus viminalis* grassy woodland (taxonomic nomenclature follows de Salas & Baker (2022)), on the edge of an intergradation zone of the dominant species with *E. dalrympleana* (Phillips & Reid 1980).

There is native grassland in the valleys. Aerial imagery shows that prior to 1976 the entire property was forested (fig. 2). By 1986 large portions of the property had been cleared, with clearance beginning prior to 1979 (fig. 2). There is a distinct clearance boundary which has remained visible in imagery to date, though woody plants, in particular *Acacia dealbata*, *A. mearnsii* and *Bursaria spinosa*, are recolonising the cleared area. These species have formed dense copses elsewhere on the property. The cleared vegetation is now a native grassland with dominance shared between *Themeda triandra*, *Austrostipa* spp. and *Poa rodwayi*.

Past use of the land is likely to have been restricted to sheep grazing in periods of inundation in the valleys. There appears to have been no ploughing or fertilisation. Fire history is unknown.

Data collection

The design consisted of three paired plots of 50 x 50 m on three aspects: northwest between 300° and 330° (pl. 1 & fig. 1), west between 240° and 270° (pl. 2 & fig. 1) and southwest between 180° and 200° (pl. 3 & fig. 1). They were contiguous along the clearance boundary. Six 5 x 5 m quadrats were in transects orthogonal to the boundary at 0–5, 5–10, 15–20, 25–30, 35–40 and 45–50 m (fig. 1). Avenza Maps® was used to map the locations of quadrats and plot corners on an iPhone 7, with horizontal accuracy of ~10 m.

PLATE 1 – Northwest aspect from uncleared area. Trees of *Eucalyptus viminalis* over a *Poa rodwayi* and *Themeda triandra* tussock grassland, with *Acacia mearnsii* in the cleared area seen at the rear. Stakes are northwest corner of 5 x 5 m quadrats.

PLATE 2 – West aspect from cleared area. Grasses dominate the cleared area and *Eucalyptus viminalis* woodland is seen in the uncleared area. Stakes are northwest corner of 5 x 5 m quadrats.

PLATE 3 – Southwest aspect from cleared area. *Poa rodwayi* grassland in the cleared area and *Eucalyptus viminalis* forest with a much denser canopy than other aspects. Stakes are northwest corner of 5 x 5 m quadrats.

Data collection occurred over four days in February, March and April 2023. The quadrats were measured out and marked at the northwest corner for each distance from clearance boundary. For the larger plots all trees were identified, had their circumference measured at 1.3 m above ground level on the higher side of the tree and heights up to 2.5 m measured to the nearest 10 cm and above were estimated from a distance. Any tree with a circumference at breast height of less than 10 cm only had their height measured, and those smaller than 15 cm in height were not measured at all. All stems of multi-stemmed trees were measured at 1.3 m, but only the maximum height was recorded.

All observable vascular plants were identified to the most detailed taxonomic resolution possible at the time of data recording. Each taxon was given a Braun-Blanquet percentage cover score (present = 1, 1–5% = 2, 6–25% = 3, 26–50% = 4, 51–75% = 5, > 75% = 6) (Braun-Blanquet 1932). This scoring system was also used for litter, wood (greater than 6 mm in diameter), rocks and bare ground. Soil depth was measured using a 10 mm x 2 m steel rod which was hammered into the ground ten times in each quadrat, nine in fixed locations and one placed through a random number generator. The fixed locations were: 0.1 m from each of the corners on a line from the corner to the centre, halfway between each of the corners and the centres; and the centre.

Data analysis

Data organisation and analysis was undertaken using *R* (2022) with packages *tidyverse* (Wickham *et al.* 2019), *vegan* (Oksanen *et al.* 2022) and *plyr* (Wickham 2011). A model to examine predictors of taxon composition in the 5 x 5 m quadrats was created using PERMANOVA with 9,999 permutations. The predictors were aspect, cleared/uncleared, soil depth, rock, wood, litter, bare ground and interaction between aspect and cleared/uncleared. The non-significant predictors at $P > 0.05$, litter, bare ground and soil depth, were deleted from the original model. An unconstrained ordination was performed, using the distance-based Redundancy Analysis (dbRDA) *capscale* based on Legendre and Anderson (1999), to visualise the dynamics of the taxa clustering in relation to the predictor variables. Vectors for wood and rock cover were fitted. Chi^2 was used to test the deviation from the expected distribution between the three aspect and two clearance classes. Pearsons Correlation Coefficient was used to determine if there was a floristic gradient from the clearance boundary into the cleared area.

RESULTS

There was an interaction between aspect and clearance class in the species composition model (tab. 1). There was stronger differentiation between the cleared and uncleared on the western aspect than on the other two aspects (fig. 3). The cleared areas were distinct floristically from the uncleared areas and the northwest-facing slope was distinct from the two others (fig. 3). Rock cover and wood were also significant in the model for species composition, their vectors indicating association with uncleared vegetation (fig. 3). The distance from the boundary in the cleared area did not significantly correlate with variation in scores on either of the axes.

Three native tussock-forming grasses and two herbs occurred in more than 80% of the quadrats (tab. 2). Of these five taxa, the grasses *Poa rodwayi* and *Austrostipa* spp. were more frequent in the uncleared area than the cleared plots. Other taxa that were more frequent in the uncleared plots were the tree *Eucalyptus viminalis* and the shrub *Styphelia humifusa*. Clearance strongly favoured the introduced thistle *Cirsium vulgare* and the native grass genus *Rytidosperma*. The shrub *Hibbertia hirsuta* and the tree *Acacia mearnsii* favoured the northwest aspect. The shrub *Bossiaea prostrata* and the tree *Bursaria spinosa* favoured the southwest aspect. The native grasses, *Microlaena stipoides* and *Rytidosperma* spp., favoured the western aspect.

Total tree basal area was highest on the western aspect and lowest on the northwest aspect in the uncleared plots, but the reverse in the cleared plots (fig. 4). The density of trees was similar between cleared and uncleared on the northwestern aspect but varied enormously on the western and southwestern aspects (tab. 3). *Acacia mearnsii* and *A. dealbata* constituted most of the tree individuals in the cleared areas (tab. 3).

DISCUSSION

Our data relate to a single site among many with similar environmental attributes. Differences in land use history in other places might have resulted in different outcomes. Our hypothesis that aspect would interact with clearance in succession is consistent with the results of our analyses. The significant interaction term between aspect and clearance class means that the response of species composition to clearance depends on the aspect of the site. Rocks and woody material also were associated with variation in the composition of taxa. Presence of rocks equates to a lack of substrate for plants which creates a distinct niche where only certain species can persist (Leeson & Kirkpatrick 2004), while woody material can totally inhibit growth or also create microclimates (Goldin & Brookhouse 2015).

TABLE 1 – PERMANOVA model for ordination scores for floristics

Variable	DF	SS	R^2	F	Pr (>F)
Aspect: Site[1]	2	0.5051	0.09983	2.4796	0.0003
Wood cover	1	0.2428	0.04799	2.3839	0.0060
Rock cover	1	0.2275	0.04497	2.338	0.0081
Residual	28	2.8520	0.56365		
Total	35	5.0599	1.00000		

[1] Site = clearance status

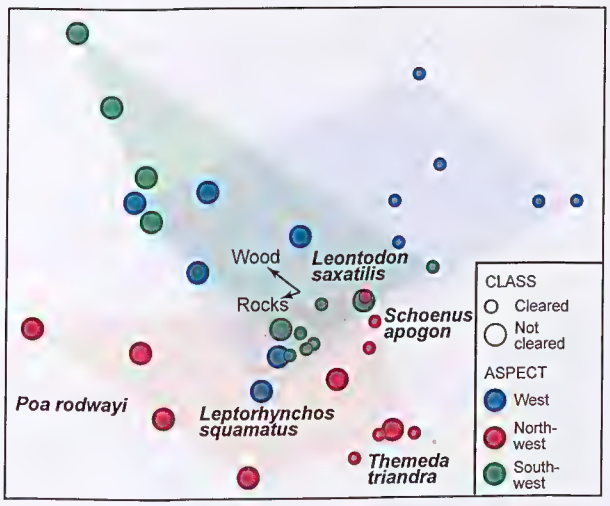

FIGURE 3 – Ordination of the 5 x 5 m quadrats, showing the (dis)similarities between quadrats. The taxa are positioned at their centroids in ordination space. Vectors for wood and rock cover are shown. Stress = 0.11.

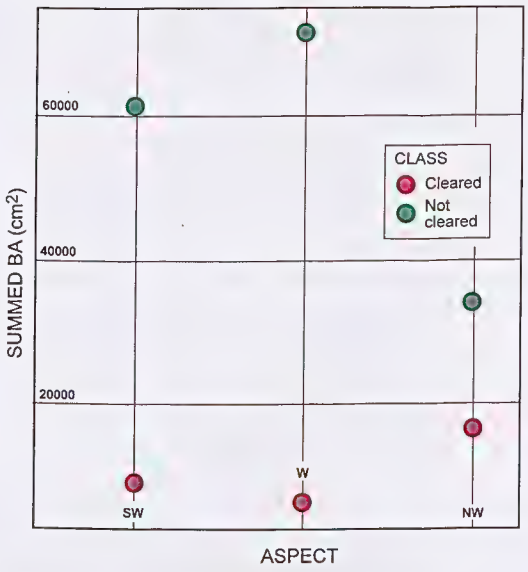

FIGURE 4 – Total basal area of all tree species according to aspect and clearance class.

TABLE 2 – Percentage frequency of taxa in aspect and clearance classes

Species	Growth form	Aspect				Clearance class		
		NW	W	SW	P	C	NC	P
Poa rodwayi	g	92	75	100		78	100	*
Themeda triandra	g	100	92	92		94	94	
Centaurium erythraea [1]	h	75	92	100		83	94	
Leptorhynchos squamatus	h	83	92	75		78	89	
Austrostipa spp.	g	58	58	67		39	83	**
Bossiaea prostrata	s	25	67	83	*	44	72	
Leontodon saxatilis [1]	h	67	92	83		89	72	
Plantago varia	h	92	67	58		72	72	
Oxalis perennans	h	75	67	75		78	67	
Euchiton spp.	h	75	50	33		44	61	
Schoenus apogon	se	67	92	50		78	61	
Solenogyne dominii	h	50	67	50		50	61	
Styphelia humifusa	s	25	67	33		22	61	*
Holcus lanatus [1]	g	42	83	58		67	56	
Eucalyptus viminalis	t	25	33	33		11	50	*
Acaena novae-zelandiae	h	58	75	83		54	46	
Hibbertia hirsuta	s	75	0	42	**	33	44	
Hypericum gramineum	h	33	40	27		39	44	
Aira caryophyllea[1]	g	75	83	42		58	42	
Acacia mearnsii	t	75	25	25	*	44	39	
Dichondra repens	h	17	50	25		22	39	
Geranium potentilloides	h	50	33	67		61	39	
Microlaena stipoides	g	0	50	42	**	22	39	
Bursaria spinosa	t	8	17	58	*	22	33	
Acaena echinata	h	17	50	42		44	28	
Opercularia ovata	h	25	33	25		28	28	
Rytidosperma spp.	g	8	58	17	*	44	11	*
Cirsium vulgare [1]	h	17	17	8		28	0	*

Taxon with less than five occurrences in an aspect of clearance class are omitted. The Chi² test determines deviation from expected frequency for each of aspect and clearance classes, * P <0.05, ** P <0.01.

[1] exotic taxon, g grass, h herb, s shrub, se sedge, t tree. C cleared, NC not cleared, NW northwest, SW southwest, W west. Species are ordered by their percentage frequency in the uncleared area.

TABLE 3 – Overall counts of all tree taxa > 150 mm in height

Aspect	NW	NW	SW	SW	W	W
Clearance class	C	NC	C	NC	C	NC
Acacia dealbata	0	0	26	67	4	0
A. mearnsii	124	93	8	22	2	4
Bursaria spinosa	5	0	2	25	1	0
Eucalyptus amygdalina	0	0	0	19	0	18
E. dalrympleana	0	0	1	0	0	0
E. viminalis	2	27	1	22	1	21
Notelaea ligustrina	0	0	0	1	0	0
Ozothamnus ferrugineus	0	0	0	4	0	0
Dead	6	4	1	29	2	8
Total	137	124	39	189	11	51

C cleared, NC not cleared, NW northwest, SW southwest, W west

However, slope position was not independent of aspect, with two aspects having the cleared area downslope of the uncleared area and one above.

The interaction term reflects differences between the responses of vegetation on different aspects to the clearing of trees. An example of this is the abundance of *A. mearnsii* in both clearance classes in the northwest while other cleared sites exhibited far less woody vegetation growth, save for *A. dealbata* in the cleared area of the southwest. The two *Acacia* species have persistent soil seed stores, unlike the eucalypts, so can occupy cleared ground, especially if it is burned or mechanically disturbed. *A. mearnsii* is better adapted to sloping sites than *A. dealbata* (Searle 1997, Gouws & Shackelton 2019). The ability of *A. mearnsii* to colonise grasslands is well documented globally (Le Maitre *et al.* 2016, Joshi *et al.* 2020). However, grasslands also exhibit resistance to densification of eucalypts, mostly due to the dense sward and root mass of perennial grasses (Fensham & Kirkpatrick 1992), a phenomenon evident in our study area. While other factors, such as frost, drought, waterlogging and grazing can also prevent seedling establishment, the topography of the site make frost and waterlogging unlikely to occur (Perry 1998). Ingram and Kirkpatrick (2013) found that native browsing pressure had a significant effect in inhibiting *A. mearnsii* establishment but not *B. spinosa*.

There was no evidence that the distance of the quadrat from the clearance boundary had any effect on the species composition, suggesting that there is no distance decline as could be expected with recolonisation from uncleared vegetation. Cramer and Hobbs (2007) outline several studies globally where distance from forest edges in old fields has a significant effect in the species composition of old fields. In North America, tree establishment was found to increase for several taxa as seedlings were placed orthogonal from the forest edge (Meiners *et al.* 2002). In our case, the removal of trees and tall shrubs from the woodland in the clearance process is unlikely to have eliminated understorey species. The floristic adjustment was likely to have been related to a change in the amount of root competition from trees. This change would not have varied with distance from the boundary.

The human-induced grassland in our study area has high nature conservation significance, making the failure of eucalypts to reinvade of low conservation concern. Most native lowland grassland in Tasmania is a product of the activities of either Palawa management or of management by graziers after the British invasion yet is recognised to be of conservation significance in the context of its depletion since 1803 (Kirkpatrick *et al.* 1995).

Old field succession dynamics is of great interest for restoration activities, as it offers a passive approach with minimal expenditure compared to tree planting and other management options (Geddes *et al.* 2011). In some cases, as in our study area, the abundance and richness of exotic taxa is restricted to those that have naturalised to coexist with native taxa (Richardson *et al.* 2000). However, this easy path may not be available with intense agricultural use of cleared areas which can alter edaphic conditions, promote aggressive exotic species and restrict native seed germination (Standish *et al.* 2007a).

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AN EVENING WITH LOUISA: HONOURING THE LIFE AND ACHIEVEMENTS OF LOUISA ANNE MEREDITH

by Mary Koolhof, Marley Large and Julie Rimes

(with three plates)

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When Louisa Anne Meredith first arrived in colonial Australia she was already an accomplished author and during the remainder of her life here her talents as a gifted painter and illustrator would receive equally high acclaim. At the heart of her work was her love of nature and through her prolific writings and social commentary, she constantly advocated for the protection of animals and their environments, making her one of Australia's foremost colonial conservationists. Louisa's legacy remains vibrant through her art and writings as a gift to the nation. She stands as a beacon for women of her time and those after.

As a generous benefactor and contributor to the Royal Society of Tasmania, Louisa Anne Meredith was awarded Honorary Membership in 1881. In 2023, in recognition of her outstanding achievements, the Society established the Louisa Anne Meredith Medal to be awarded to similarly worthy recipients. The medal was announced at Government House in a gala celebratory event *An Evening with Louisa*, which included a fitting tribute in the form of a masque performance. The event also raised funds for the conservation and restoration of the Society's extensive Art Collection which includes over 250 of her watercolours and sketches.

Key Words: Louisa Anne Meredith, Royal Society of Tasmania, masque, medal, Government House, wildlife protection, natural history art.

A LIFE OF ACHIEVEMENT

This brief account of Louisa Anne Meredith is derived from the following sources (O'Neill 1974, Ferris 2017, Hansen 2019, 2022) as all her achievements are too numerous to list here. Born 20 July 1812 in Birmingham, England, Louisa Anne Meredith (née Twamley) was raised in the Regency period defining the qualities of elegance, refinement and social conscience. From an early age she developed a love of literature and the arts, excelling in both, and stirred by her passion for animals and nature, these pursuits were to define her in adult life.

Soon after arriving in Australia, Louisa and her husband Charles Meredith moved from Sydney to Van Diemen's Land in 1840 and it was here that Louisa produced her most prolific work. Meredith published at least twelve books, including several of poetry, fiction and biographical accounts of her life in Australia. In 1852 she published a companion account in two volumes, *My Home in Tasmania, during a Residence of Nine Years* and in 1880 *Tasmanian Friends and Foes, Feathered, Furred and Finned*, subtitled as a family chronicle of country life, natural history, and veritable adventure. Meredith's *Bush Friends in Tasmania* was published in two volumes, the first in 1860 and the second in 1891, when at the age of nearly eighty she travelled to London to oversee its production.

Louisa Anne Meredith became an accomplished painter and natural history illustrator, with many of her studies of local flora and fauna displayed in her books in full-coloured plates. Her writing and drawings were highly acclaimed and many were entered in exhibitions in Australia and overseas (https://dxlab.sl.nsw.gov.au/art-index/artist/1394/). For example, at the Melbourne Intercolonial Exhibition of Australasia in 1866 she entered this range of items: a glass case containing her works in prose and verse (book), multiple sketches of Tasmanian scenery and twelve drawings of Tasmanian flowers and shrubs, some with insects, etc. This exhibition attracted nearly 3,000 entries from Australia, New Zealand and beyond, and awarded 648 medals of excellence and 50 special merit medals for endeavours across categories. Louisa was awarded a special merit medal for 'Art combined with Literature', the only woman to have received one. The medal is 22 cm in diameter in the neoclassical style, showing seven female figures bringing gifts to Victoria, symbolic of the outstanding accomplishments of the medal winners.

Louisa's artistic talents however, extended to so much more. Among her other notable achievements were her design of an early platypus stamp, the black swan seal for the Glamorgan municipality and lyrics for the *Song of Welcome* performed in celebration of Prince Alfred's visit to Hobart in 1868. The score was printed with a cover illustration depicting a laurel wreath in green ink encircling the name 'Alfred of England', L.A.M. Del. et Lith. and marked with L.A. Meredith's monogram (https://thomasnevin.com/tag/louisa-anne-meredith/).

Louisa had a strong moral and social conscience and cared deeply about animal welfare. In 1878 with Mary Selina Gellibrand, she jointly founded the first Tasmanian branch of the Society for the Prevention of Cruelty to Animals and continually encouraged her husband while a member of Parliament, to legislate for the preservation of native wildlife. She spoke out against the introduction of exotic animals to Tasmania by the Acclimatisation

PLATE 1 – Louisa Anne Meredith, and a plate from her book *My Bush Friends in Tasmania* depicting flowering blue gum *Eucalyptus globulus* intertwined with blue love creeper *Comesperma volubile*. Images from the Royal Society Collection.

Society and the wanton destruction of helpless creatures for recreation and sport (Petrow 2023). In recognition of her lifelong achievements, in 1884 the Tasmanian government granted Louisa a pension of £100 for 'distinguished literary and artistic services' to the colony. Late in life this pension was to sustain her financially before her death in 1895.

AN EVENING WITH LOUISA

On 28 Sep 2023, over 130 Royal Society members and supporters attended a gala event at Government House as guests of the Society's Patron, Her Excellency the Honourable Barbara Baker AC, and Emeritus Professor Don Chalmers AO. The occasion, *An Evening with Louisa*, was a reception to raise funds for the conservation and restoration of artworks in the Society's extensive Art Collection which includes 252 watercolours and sketches by Meredith.

The evening began with an address by the Society's Patron, the Honourable Barbara Baker AC, Governor of Tasmania:

> Good evening and welcome to this fundraising event for the Royal Society of Tasmania's Art Collection. I begin by paying my respects to the traditional and original owners of this land: the Palawa people. I acknowledge the contemporary Tasmanian Aboriginal community and recognise their enduring culture and continued connection to land, sea and waters.

I'll be brief in my remarks as we have much to look forward to this evening. It was 157 years ago, in these rooms, that Louisa Anne Meredith's *The Masques of Christmas, and of The Old and New Year* was performed. The Souvenir booklet, images of which are in the RST program pamphlet and on display, are a unique visual record of what was a significant ensemble performance. Among those amateur thespians in the photographs: Louisa; her husband Charles Meredith, State member of Parliament and one-time Colonial Treasurer; Harriet Gore Browne, wife of the then Governor Sir Thomas Gore Browne; and Major James Wingate, a well-known Hobart photographer. And given the relationship of Lousia to the Society, this is a most fitting way to support and enjoy this fundraiser for a most important cause – your Art Collection.

The Royal Society of Tasmania Art Collection comprises 940 artworks, of which 252 are works by Louisa Anne Meredith, one of Australia's leading nineteenth-century professional female artists. The Collection is on loan to TMAG where it is kept under optimum conditions for preservation. Last year's RST fundraising evening here raised over twenty-four thousand dollars from ticket sales, donations and sales of artwork reproductions on the night. A large portion of those funds purchased top-quality Solander archival storage boxes to house the works in the RST Art Collection. And the

remaining funds will go towards the conservation of targeted artworks when the conservator has finished the Conservation Needs Assessment.

Art Valuer Warwick Oakman has said, and I'll quote: "*Louisa Anne Meredith actively took a role in the introduction of environmental conservation legislation and may be reasonably argued to be the first in the country, and one of the few women in the world at this time, proposing legislative protection for the natural environment/wilderness.*"

Adding this to her prolific output of botanical art and her many publications – one of which was described by the Illustrated London News (1859) as 'The most splendid gift-book of the season' – reconfirms her place as a significant historical person.

I'll conclude with some observations about her from Harriet Gore Browne, whose huge diary discussed and described countless people of the time who moved in their social circles. Harriet's diary is called *Beware of Mrs Browne*; and believe me, she did not hold back in her judgement of others! Louisa generally got off lightly. Here are a few out-takes from the diary:

'*Mrs Charles Meredith, the Authoress was there. Not a natural or pleasing person, but certainly clever and agreeable to talk to. We settled to have a Shakespeare reading and she talked well. The refreshments in the dining room consisted of jellies, creams, tipsy cakes, sandwiches, tea, coffee, sherry and hot white and brown soup… Mrs Meredith arrived [at Government House] and as usual wanted to see me. She was very gracious … Mrs Meredith's charade of Pygmalion was most effective … Mrs Meredith, altho' her gowns generally have lost the freshness of first wear, is always in a very tastefully dressed black silk and pointed wreath of corn … On Sunday the 5th we spent the afternoon in turning the big office into a fit sitting room for Prince Alfred, hanging Mrs Meredith's pictures round it, spreading maroon tablecloths and giving the whole room a great air of comfort … 5000 schoolchildren sang Mrs Meredith's "Ode of Welcome" to the Prince.*'

End of gossipy snippets! Thank you and do enjoy the evening.

RST President Prof Jocelyn McPhie offered this response to Her Excellency's remarks:

'Your Excellency, Professor Chalmers, Royal Society of Tasmania members and guests. I have four messages. The first comprises a series of thanks. At the top of the list, thank you to Governor Baker and Professor Chalmers, and indeed the entire GH staff for your exceptional generosity in hosting this event and providing the reception. The Royal Society of Tasmania enjoys consistently strong support from our Patron, Governor Baker, which we greatly appreciate. The second 'thank you' is directed to the Society volunteers who have been working for months to ensure this event happens as planned. The key players have been Mary Koolhof, Dr Julie Rimes, Marley Large, Prof Ross Large AO and Bronwyn Beechey, but the entire team has contributed a great deal of time and effort.

The last 'thank you' is to all of you – in buying a ticket and attending this evening, you have shown your support for the Royal Society of Tasmania Art Collection. We now know this collection is not just of state significance but of national significance in recording much about the history and culture of the early colony. The Society has the responsibility to properly manage and conserve the collection and that is an expensive undertaking, far beyond our normal operating budget. Hence the need to raise funds. Given the size of the collection, this preoccupation with fund raising is set to last for the foreseeable future.

Many of you made donations to the Art Fund at the same time as purchasing tickets – that is fantastic and greatly appreciated. The opportunity to donate has not passed and donations can be received throughout the evening. There will also be a chance to contribute further in a big way. The last item on tonight's program is the auction of a painting by Lynne Uptin. Lynne is an internationally renowned botanical artist and a member of the Society. She has very generously donated her painting for us to sell or auction, and the proceeds will go to the Art Fund. Ross Large will be in command for the auction. You might be the lucky person taking this painting home – all you need is a loud voice and a credit card.

The third message is an announcement. Some of you will be aware that the Society offers medals to outstanding scholars, for recognition and for encouragement. The Council recently approved a new medal, to be called the Louisa Anne Meredith Medal. This medal is intended to honour a person who has made an outstanding contribution in the humanities, arts and/or social sciences, reflecting the areas in which Louisa Anne Meredith was a champion. The medal will be offered for the first time in 2024. The Society sees this new medal as a lasting tribute to Louisa Anne Meredith.

Finally, you will be interested to know that some members of Louisa Anne Meredith's family are present, including her great-great-great granddaughter, Louise Gillet. Louise and her husband Peter have travelled from Melbourne specially to join us. Louise brought a medal won by Louisa at the 1866-1867 Intercolonial Exhibition in Melbourne, for 'Art combined with Literature'. Like so many of the honours and awards won by Louisa during her life, she was the only woman to have received this award. The medal is on display in the Drawing Room. It is a magnificent object and not what you are probably expecting. Louise has kindly offered to answer questions and explain the medal further to anyone who is interested. I hope you all enjoy the evening.'

PLATE 2 – (**A**) Louisa performing in a masque at Government House in 1866 standing directly behind her husband Charles dressed as Father Christmas (State Library of NSW 2016), and (**B**) 'A Modern Masque' performers at Government House in 2023 (back L to R, Melissa Cuthbertson, Zoë Fitzherbert, Thomas Rimes, front L to R, Pearl Smithies, Ji Won Kim, John Williamson).

A MODERN MASQUE

The President's speech was followed by a modern adaptation of a masque like those Louisa enjoyed and participated in while attending Government House in the nineteenth century. Masques or tableaux vivants (living pictures) flourished in Europe from the Middle Ages as a form of festive courtly entertainment and often involved elaborate costumes and props to create a scene, sometimes with music and dancing and sometimes silent mimed spectacles (State Library of NSW 2016). A highly regarded American theatre performer visiting Tasmania, Joseph Jefferson, who saw Louisa performing at Government House remarked that 'she was capable of rivalling Fanny Kemble on the stage and as an interpreter of Shakespeare on the platform' (O'Neill 1974).

In 1866 Louisa wrote and designed *Souvenir of the Masques of Christmas, and of the Old and New Year* to accompany a performance at Government House (*Tasmanian Morning Herald* 1866, 13 February, p.2). The first tableau shows a photograph of her husband Charles elaborately dressed as Father Christmas, with Louisa standing directly behind him.

The entire original script of 'A Modern Masque' presented here includes details of the music and scenes enjoyed by the audience, with everything said by the costumed 'Louisa' coming directly from her own writings (Meredith Letters 1883, 1835).

Script

Cast: John Williamson – narrator, Melissa Cuthbertson – Louisa Anne Meredith, Thomas Rimes – piano, Zoë Fitzherbert – soprano, Ji Won Kim – violin and Pearl Smithies – dancer.

Stage direction: Start. Music – Thomas Rimes enters, acknowledges the audience, and begins the piano introduction as the setting up of stage and players commences. Dancer enters first, she takes in the surroundings, creates a sense of wonder taking in the beauty around her. Freezes in position near piano. Soprano enters, takes in the atmosphere, moves slowly to seat, violinist enters and takes her position, and finally Louisa walks onstage, her notebook, perhaps some paintbrushes in hand. Narrator enters. Dancer freezes with mask on until the beginning of the next musical interlude. Musicians freeze with masks on.

Narrator: In the heart of Birmingham, England, Louisa Anne Twamley flourished. Tutored by governesses and her mother's wisdom, by 1838 she moved between roles as a landscape artist, poet, botanical illustrator, and the city's theatrical critic. Unlike many young women of her era, Louisa stood independent, basking in her literary triumphs and the camaraderie of fellow artists. Yet, in 1833, amidst a visit to Gloucestershire, a letter from Uncle George Meredith in distant Van Diemen's Land beckoned. He offered her an annual stipend of 100 pounds to cross the seas and embrace a role as governess for the children of his second marriage.

Louisa: My dear and ever kind Uncle, From the picturesque residence of Uncle John in Gloucestershire, I am enveloped by nature's beauty. Between my sketches, music, and strolls, I am awash with pleasure. However, the emptiness of idle gossip is a misery to me. True joy lies in the genuine company of cherished friends and the literary treasures they offer.

Your kind intentions overwhelm me, but I must raise crucial concerns. Firstly, could you expect my parents, with their profound love for their only child, to bear an eternal separation? And as for me, how could I forsake the familiar pleasures and growing recognition in my hometown, where my upcoming literary work is eagerly awaited?

In Van Diemen's Land, would my art be reduced to verses for whales or songs for kangaroos? And considering my skills, I could command a comfortable salary here without the perils of a treacherous voyage to a distant land. With deepest respect, I must decline your generous offer.

Stage direction: Music – brief piano interlude played by Thomas Rimes to indicate scene change. Dancer moves from piano to Louisa centre stage. Movement is cheeky, youthful, like Puck, she represents Louisa's muse. Dancer playfully takes Louisa's pencil and Louisa takes it back. Dancer leans on Louisa's chair and listens intently as Louisa writes her letter.

Louisa: Dearest Aunt, Mamma no longer writes, so I've taken on the responsibility of correspondence for our family. My time is precious, and I prefer purposeful and intellectual engagements over idle social calls. I have meaningful duties, even officially overseeing all the work of the Corn Inspector for Birmingham, a role Uncle Henry secured for me after Papa's passing. I like my own company so well that unless I can find better, I prefer home – my painting, music, writing, study, work and business, leave me little excuse for being elegantly idle. I eagerly await your thoughts on my newly-released poems, which have received generous praise here and pleased their young authoress exceedingly.

Stage direction: Dancer moves towards Louisa, takes the brown paper parcel from her, and moves off stage to the conservatory. Dancer remains off stage during the narration that follows.

Narrator: In the midst of her literary successes in England and her mother's declining health, Louisa found time to host her charismatic cousin, Charles Meredith, in 1838. His allure was undeniable; she chose his company in New South Wales over other enticing opportunities. Marrying Charles in 1839, they set sail for Sydney.

Her first Australian year inspired the bold *Notes and Sketches of New South Wales*. Though its candid nature was met with mixed feelings in Sydney, it found a wide readership in a book-hungry colony. Yet, despite her accomplishments and independence, her identity shifted subtly; when she bore her first child, she was merely mentioned as "the lady of Charles Meredith, Esq." By 1840, the family journeyed to Tasmania.

Louisa: The rough weather at the end of our voyage hindered my full appreciation of the Derwent's beauty as we neared Hobarton. The town's location is breathtaking, nestled on the Derwent's banks, surrounded by green meadows, gardens, and scenic residences, with snow-capped mountains towering above. The chain-cable's rattle was a welcome sound, made even more delightful perhaps by our recent close calls — it rivalled the finest concerto.

Stage direction: Musical interlude played by Thomas Rimes on the piano – indicates time/scene change. Dancer re-enters and circles around Louisa's chair. Louisa hands her letter to the dancer. Dancer places her mask on Louisa's side table, moves to the piano area and freezes.

Narrator: Over the next nine years, Louisa's passion for Van Diemen's Land's natural beauty merged with her talents, producing stunning depictions of flora, fauna, fish, and frogs. Some of these are with us tonight and featured in her published works. Louisa was the first Australian woman to achieve literary renown in international circles. She took delight in the beauty of her new world as this musical adaptation of one of her poem's attests.

Stage direction: Thomas Rimes piano and Zoë Fitzherbert soprano perform "On Orchids": music by Thomas Rimes, words by Louisa Anne Meredith.

Narrator: Alongside poetry and observations, her whimsical nature shone through. For instance, she crafted a humorous watercolour titled *A Cool Debate*, a delightful portrayal of frogs now in the Royal Society of Tasmania Art Collection. This playful spirit is also evident in her tales from *Some of my Bush Friends* Volume 2.

Louisa: In one of my Tasmanian homes, a garden pond was adorned with a rustic wooden bridge. Whenever leisure beckoned, I'd tread silently down the rose-covered path to the bridge, hoping not to disturb the foliage. Occasionally, I'd find my frog parliament deep in debate, unaware of my presence. My regal friends posed for me, albeit restlessly, beneath a glass shade before I returned them to their river. I imagine their "adventures" became a hot topic in their subsequent debates.

Narrator: By 1851, Louisa had settled in Orford and soon produced *My Home in Tasmania*, a candid narrative dispelling myths about Van Diemen's Land. Through her unique blend of art, poetry, and prose, she depicted her deep bond with nature. Notably, her works like *Tasmanian Friends and Foes* and seven poetry collections between 1842 and 1892 were well-received.

She found time to travel to Hobart and to take an active part in the civic life of the growing city. Her masques at Government House were much-anticipated and a highlight of colonial life. She drew on the talents of local artists and friends to create these works along with her own impressive talents. We can imagine perhaps a scene such as this.

Stage direction: Music – Thomas Rimes and Ji Won Kim play *Méditation* from the opera *Thaïs*, Jules Massenet. As Thomas plays the introduction, dancer collects her mask from side table and joins other performers in a tableau with masks on, centre stage. No mask for Ji Won, dancer takes Louisa's seat, Louisa stands behind chair, singer forms a tableau with this group, and observe the violinist. After music dancer moves back to piano area to freeze, mask on. Others return to their original places.

Narrator: Recognizing her remarkable talents, Louisa Anne Meredith was honoured with a medal at the 1866

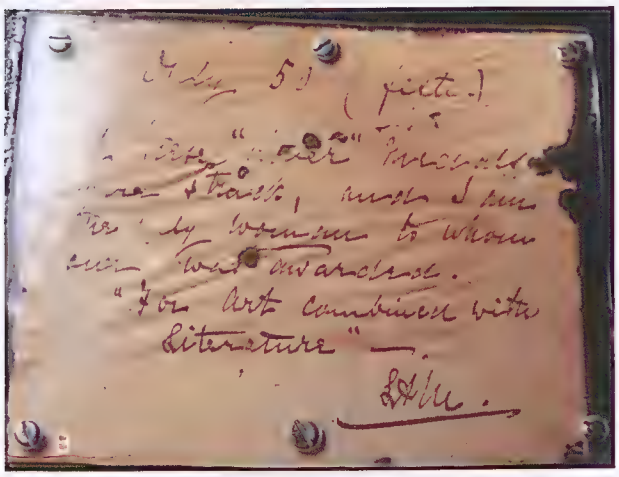

PLATE 3 – (**A**) A Meredith family portrait: (from left) Isabel Clerk, Michael Meredith, Louise Gillett with Alex and Rosalind Pitt. (**B**) The reverse side of the medal showing Louisa's own handwriting noting only 50 medals were awarded and being the only woman to have received one.

Melbourne Exhibition for her wildflower illustrations. Beyond her artistic achievements, Louisa championed environmental conservation, co-founding the first Tasmanian branch of the Society for the Prevention of Cruelty to Animals and constantly advocating for the protection of Tasmania's wildlife and pristine habitats through her writings.

Louisa: The majestic Forest Kangaroo, once common, has become scarce in populated areas. Legislation now aims to protect kangaroos on Crown lands. As for the platypus, only Dr. Bennett of Sydney has tried taming them. Despite his intriguing efforts, they sadly didn't survive long. It's disheartening how many are sacrificed for scientific inquiries.

Narrator: In 1880, Louisa became Australia's first woman to design a postage stamp, showcasing a captivating platypus. Created initially as an illustration for the Tasmanian duty stamp, its popularity skyrocketed, leading to its adoption as a postal stamp within two years. Throughout her life Louisa Anne Meredith was a generous benefactor and contributor to the Royal Society of Tasmania. By 1881, her dedication to Tasmania's natural history earned her a unique honour: she became the first female honorary member of the Society. Louisa's legacy extends beyond art and accolades; she tirelessly championed the preservation of our natural world.

Stage direction: Musical interlude played by Thomas Rimes – change scene/ leads to soprano solo. Dancer moves more slowly, mournful, does a loop around Louisa's chair. She sits beside Louisa's chair, holds mask at heart level. She looks at Louisa. She remains in a freeze until the final bows. Thomas Rimes and Zoë Fitzherbert perform *The Dew Fairy Aria* from *Hansel and Gretel*, Engelbert Humperdinck.

Narrator: In the midst of the breathtaking natural beauty that surrounded her, Louisa Anne Meredith found not only inspiration and wonder but also a growing deep concern for the impending destruction and desecration of the precious environment. As the pristine landscapes unfolded before her, she couldn't help but see the looming threat posed by human activities. Her heart resonated with the need to protect and preserve the exquisite wonders of the natural world, a sentiment that would become an enduring theme in her life's work. In the delicate balance of nature, she saw both its fragility and its resilience, and her voice would echo through time as a passionate advocate for its safeguarding.

Louisa: The town's growth and expanding cultivation have erased countless beautiful ferns, replacing verdant bowers with barren, charred landscapes. Adding to this destruction

is the thoughtless habit of cutting ferns to display them in town, resulting in faded, sorrowful remnants.

Narrator: After several bank failures in the late 1880s, Louisa, having lost much of her savings, sought aid from the Tasmanian Government. Recognising her invaluable contributions to preserving Tasmania's wildlife and documenting its natural beauty, she was awarded a unique pension in 1884 for her 'exceptional literary and artistic contributions', the only female artist to receive such an honour in Van Diemen's Land. By 1895, her health waned, leading to her passing, in Victoria, at age 83.

Stage direction: Thomas Rimes and Ji Won Kim perform the *Theme* from *Schindler's List* by John Williams.

Narrator: Louisa's legacy remains vibrant through her art and writings — a testament to her passion for Tasmania's natural splendour and her pioneering spirit. Often described as "A poet in feeling and an artist by instinct", she stood as a beacon for women of her time and those after. Beyond this, her pivotal role as one of Tasmania's top colonial conservationists paints a fuller image of her impact. The Royal Society of Tasmania treasures her works, a testament to her lasting influence.

And so, our Masque in honour of this remarkable woman has drawn to a close, yet let it be known that while our performance may end the life's work and extraordinary achievements of Louisa Anne Meredith live on, her influence remains ever-present as a tribute to her remarkable journey.

Stage direction: Thomas to play some underscore music through the final paragraph to indicate this is the conclusion. Musicians/actors/dancer/narrator move to central stage, link hands prepare to bow. Then indicate to Thomas who joins them.

End.

LOUISA ANNE MEREDITH MEDAL

Meredith was an active contributor to the Royal Society of Tasmania. Over several decades she sent interesting specimens to the Royal Society Museum and her meticulously accurate watercolours were regularly presented at Royal Society meetings. The Society maintains many of her rare books and papers in its Library and a large number of sketches and watercolours in its Art Collection, many of which were donated. These artworks include her frog favourite *A Cool Debate* and 39 of the original watercolours from *Some of my Bush Friends in Tasmania* Volume 2 featuring exquisite illustrations of iconic wildflowers (Hansen 2022).

In 1881 Louisa Anne Meredith became an Honorary Member of the Royal Society of Tasmania, the first female and one of only a few to have ever achieved this status. In further recognition of her outstanding contribution, the Society this year approved the establishing of a new medal, the *Louisa Anne Meredith Medal* to honour her. It is proposed the medal commence in 2024 and be awarded on a four-year cycle to a person who has made exceptional whole-of-career contributions in any area within the arts or humanities or both. Schedule 1 of the Rules of the Society will now be updated to incorporate this detail; the conditions and nomination guidelines have been completed and an attractive medal has already been designed by RST Council member and Honorary Curator Dr Anita Hansen.

ACKNOWLEDGEMENTS

We extend sincere thanks to Her Excellency and Professor Chalmers for hosting the RST's *An Evening With Louisa*, and to the Government House team who provided enormous support before and during the event, including Executive Chef Ainstie Wagner and her team for the gourmet masterpieces and Pipe Major David North who piped the guests to supper with a rendition of *Auld Lang Syne*. Prof Ross Large AO led a group of volunteers including Marley Large, Julie Rimes, Lorraine Polglase and John Williamson in setting the scene with a display of Louisa's works, and Government House Official Secretary, David Owen, arranged an appealing display of Louisa's works owned by Government House including photographs from her performances there in the nineteenth century. Thanks also to RST President Prof Jocelyn McPhie for responding to the evening, Bernard Pryor OAM and Heather Pryor for the photographic record, and Leanne Balmforth for designing the printed program.

RST Vice-President Dr Julie Rimes led the creative team of Marley Large, Thomas Rimes, Dr William Simon and Meg Johnson in developing the modern adaptation of the masque which featured the highly talented cast of RST Council member John Williamson, actor Melissa Cuthbertson, composer Thomas Rimes, soprano Zoë Fitzherbert, musician Ji Won Kim and repertory performer Pearl Smithies. We also sincerely thank several relatives of Louisa Anne Meredith: Michael Meredith, Josephine Lynch, Isabel Clerk, and Louise Gillett from Melbourne with her husband Peter for their attendance and bringing for display the medal won by Louisa at the Intercolonial Exhibition of Australasia in 1866 and its accompanying information.

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